User Manual – MPH100/400

MPH series video encoders

H.264 / MPEG-4 / MJPEG / MPEG-2 video encoders
for PTZ and fixed camera networking applications

MPH101/111 – 1-ch stand-alone video encoder
MPH102/112 – 2-ch stand-alone video encoder
MPH401/411 – 1-ch rack mount video encoder
MPH402/412 – 2-ch rack mount video encoder

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MPH Series Video Encoders Introduction

Stand-alone video encoder with 1 or 2 video inputs, bi-directional data and contact closure channels

***Note**! This product is under development and Teleste reserves the rights to alter specifications, features, manufacturing release dates and even the general availability of the product at any time.*

General

MPH series encoders are ONVIF (Open Network Video Interface Forum) compliant products. This provides wide interoperability with any ONVIF compliant device or system.

Many similarities exist between the **MPH** series video encoders; the main difference being the number of video channels available and the mechanics. **MPH** series video encoders are high performance video processing products encoding real time video in mission critical applications for customers in Transportation, City Center Monitoring, and Corporate Security. **MPH100** series encoders are temperature-hardened compact size stand-alone video processing products in the **MPX** platform. **MPH400** series encoders are compact size rack mount video processing products in the **MPX** platform.

MPH series video encoders provides in addition to transparent link of CVBS video signal, independently configurable general-purpose bi-directional asynchronous data and bi-directional contact closure channels.

The encoded signal from **MPH** series encoder can be decoded with **MPC/MPX** (except H.264) or **VMX** series HW and/or SW, as well as with industry standard SW players such as Quicktime and VLC. The transmission is accomplished over 10/100/1000BASE-T or 100/1000BASE-X (SFP) network utilizing IP/Ethernet streaming.

MPH series video encoders are equipped with the **H.264**, **MPEG-4**, **MJPEG** and **MPEG-2** video encoding engine. The default encoding combination is H.264 and MJPEG. MPEG-2 and MPEG-4 are add-on options, and they should to be ordered separately.

The **H.264** video encoding engine is compliant with the ISO/IEC 14496-10 (H.264@MP, BP, CBP) standard. The **MPEG-4** video encoding engine is compliant with the ISO/IEC14496-2 (MPEG-4@SP/ASP L5) simple profile standard. The **MJPEG** video encoding engine is compliant with the ISO/IEC 13818-2 (RFC 2435) standard. The **MPEG-2** video encoding engine is compliant with the ISO/IEC13818 (MPEG-2 MP@ML) standard.

> *Note! **Audio** is not supported in **MPH100/400** series encoders. Audio is supported in **MPH200** series encoders.*

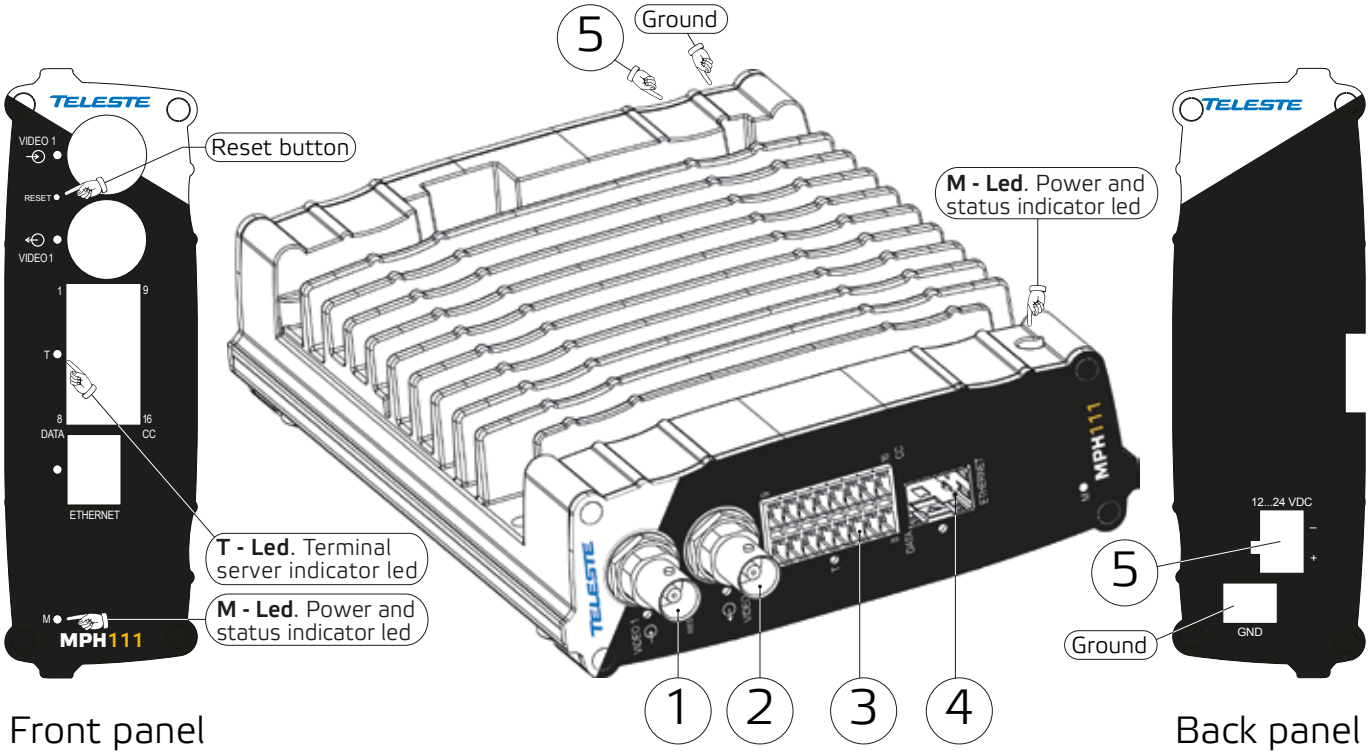
General-purpose asynchronous data channels are transferred separately from the encoded video signals.

Firmware version

The functionality and operation of the devices described in this manual applies for firmware version **2.0.x**.

MPH Series Video Encoders Front and Rear Panel

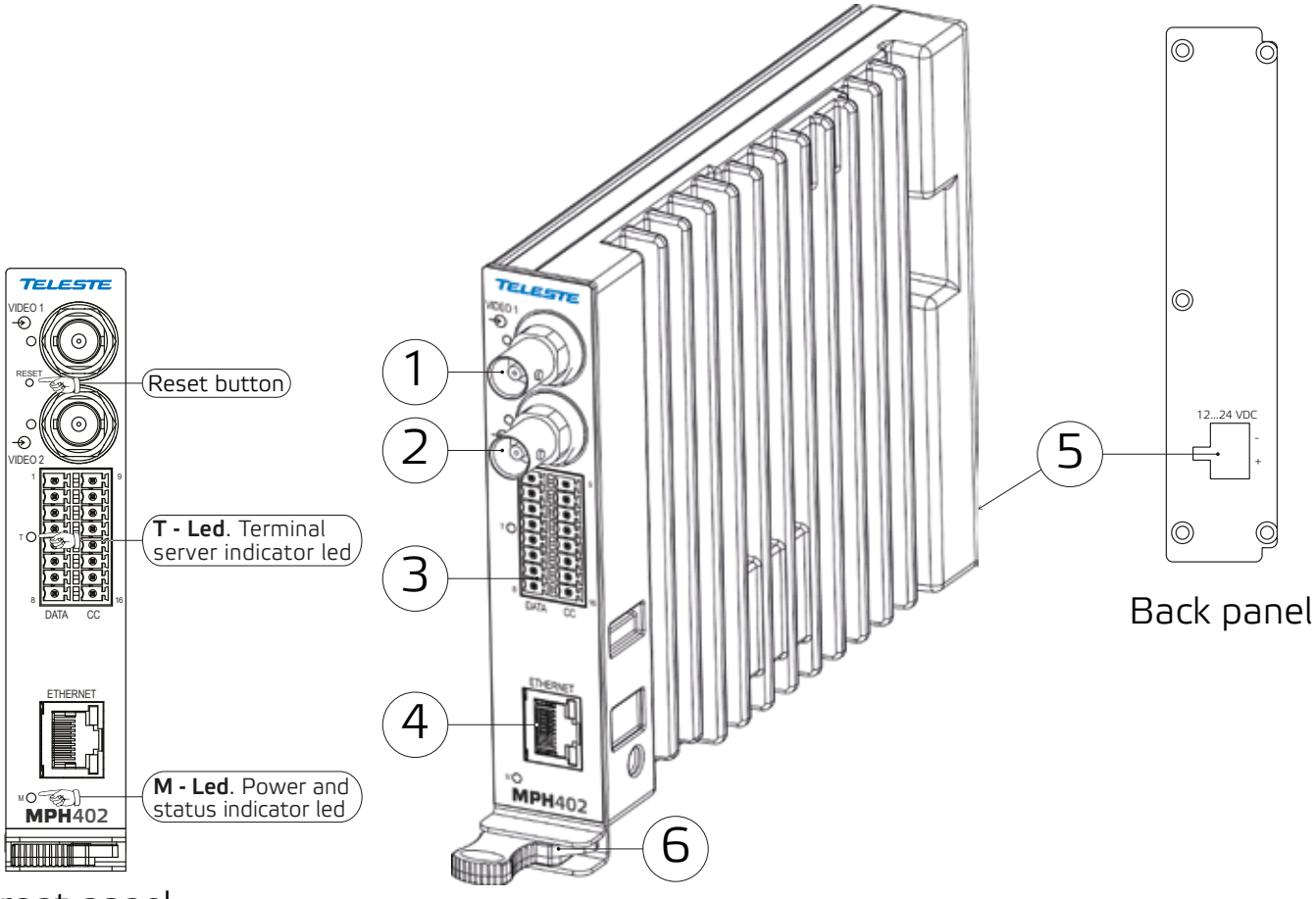
MPH100 stand-alone encoder (example view from MPH111 device)



Front panel

Back panel

MPH400 rack mount encoder (example view from MPH402 device)



Front panel

Back panel

MPH100/400 series video encoders mechanical connections

1. **Video input 1** (BNC female) and indicator led.
2. **Video input 2** (BNC female) for 2-ch versions or
   Video loop through port for 1-ch versions and indicator led.
3. **16-pin screw terminal** and T indicator led:
   Data interfaces, EIA RS422/485 (data1), EIA RS232 (data 2) /management interface (CLI) or general purpose serial port.
   Contact closure interfaces (cc input 1, cc input 2, cc output)
4. **Ethernet interface**, fixed (RJ-45 female) or socket for SFP module (available with a variety of types).
5. **Power supply** connector (2-pin screw terminal, +12...28 VDC).
6. **Handle** (MPH400 series only).
   Reset button: Device software reboot and hard/soft factory defaults restoration (see section Factory reset).
   Ground: Device ground connection.

Led	Colour	Mode
M	OFF / Dark	Power off
	Yellow	Device starts up
	Red	Device self-test failed
	Green	Power on / Device is functional
	Blinking Green	Device is being accessed from any interface. Whenever device is accesed from WebUI, CLI or ONVIF interface, led blinks 2s. During software update, LED will blink throughout the firmware image transfer duration.

M - (module/power led) LED indicator operation. This LED indicates power status, factory reset, interface activity.

Factory reset

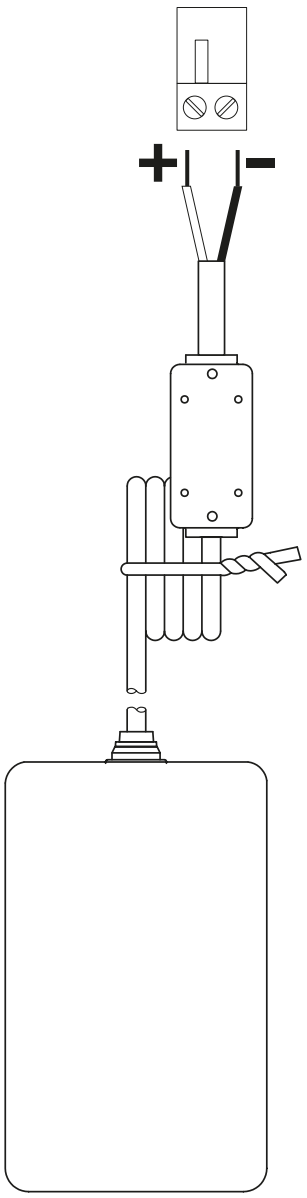
The factory reset can be done via **WebUI**, **CLI**, or using the pin-hole **reset button** on the front panel of device. There are two types of factory resets; Soft factory and Hard factory reset. The Soft factory reset restores all, except IP configuration to the default factory settings. The Hard factory reset restores all settings to default factory settings.

Reset pinhole

The reset pinhole is a button that resets the device to its original default settings. To use this button, insert a stiff wire (such as a straightened paper clip) into the pinhole. If you release the button immediately the device will reboot with current settings. But if you hold the button you can restore the default settings as following table shows.

Led	Colour	Mode
M	6 x (short) green blinks at boot time	Time window to select Soft factory reset. If reset button is released in this time window, soft factory reset is selected.
	2 x (short) red blinks	Soft factory reset shall be applied. Wait until device has fully started (power led green).
	24 x yellow blinks at boot time (after the 6 green blinks)	Time window to select Hard factory reset. If reset button is released in this time window, hard factory reset is selected.
	4 x (short) red blinks	Hard factory reset shall be applied. Wait until device has fully started (power led green).

Getting started



CPS25x series power supply for **MPH100** device.

Quick instructions

1 Install the temperature hardened stand-alone **MPH100 series** encoder to the installation location. A +12 V supply voltage is provided by a **CPS25x** series power supply (see example picture beside), or alternately through the LAN cable (CAT5) when using Power over Ethernet (PoE) technology.

1 Install the rack mount **MPH400** series encoder into a **MSR416** installation frame equipped with a **MPS12x** series power supply.

2 Connect all needed signals to their respective connectors on the device's front panel:

- **Data** and **contact closure** signals to the screw terminal connector.
- **CVBS** video signals to the BNC female connector(s).
- **Ethernet** network to Ethernet connector.

3 Switch on the power and wait until the power led "**M**" lits green (start-up time approx. 100 secs). This indicates that the device hardware is operating properly and ready for usage.

Note! *If led doesn't lit green, refer to "M- LED indicator" section to know the status of the device.*

4 Log on to the device using the IP address assigned by DHCP server, or locally from a Mgmt port (CLI) and then set all necessary settings in the device.

Note! *If network doesn't contain DHCP server, then the MPH encoder shall use Zeroconf (link-local) as DHCP fallback.*

Device's IP address

There are two ways of assigning IP address to the MPH device. The IP address can be automatically assigned via DHCP, or you can set it manually as a static IP address. Factory default IP settings for the device is DHCP enabled.

By default when you have DHCP server in the network, DHCP server assigns an IP address automatically to the MPH encoder. The DHCP server offers an IP address from its address pool when a device is starting up.

If DHCP server is not available device uses zero configuration (link-local address) as DHCP fallback. With Zeroconf protocol MPH chooses an IP address randomly in the IP range from 169.254.0.1 to 169.254.255.254.

Alternatively you can manually assign the IP address, subnet mask and gateway address to the unit.

If there is no DHCP address in the network, the unit chooses randomly an IP address from the private IP range 169.254.0.1 - 169.254.255.254. In this case in order to find the chosen IP address you have two options. You can use Teleste MPH Discovery Tool to browse all the available ONVIF compliment devices in the network, note that your PC IP address should be in the same IP range. Second option is, connecting to the MPH device locally via the serial port and use the CLI (Command Line Interface) to see device IP address.

See section **Network command** to see how to change IP address via CLI.

MPH100/400 Series Combinatios

Electrical RJ-45 Ethernet interface.

Small form-factor pluggable (SFP) Ethernet interface.

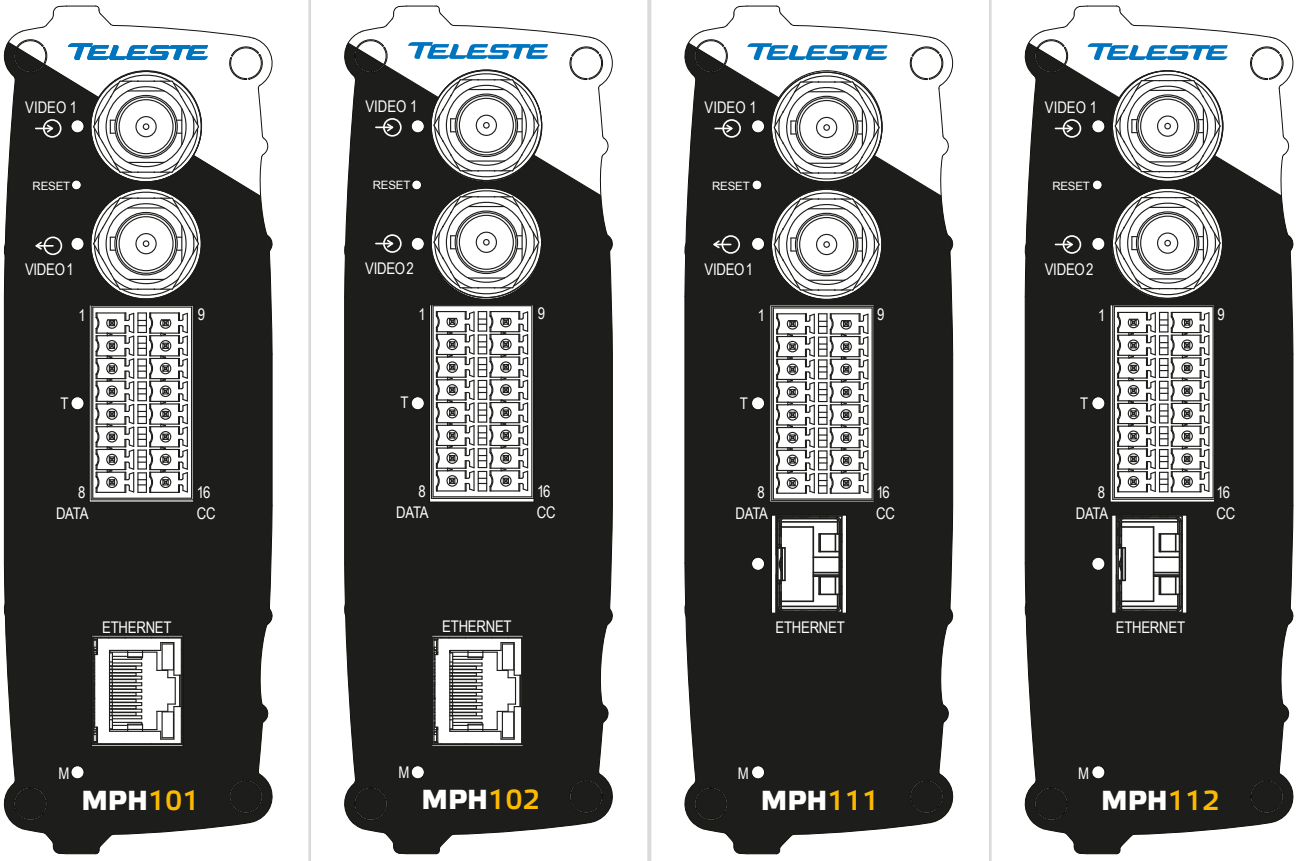
One video input.

Two video inputs.

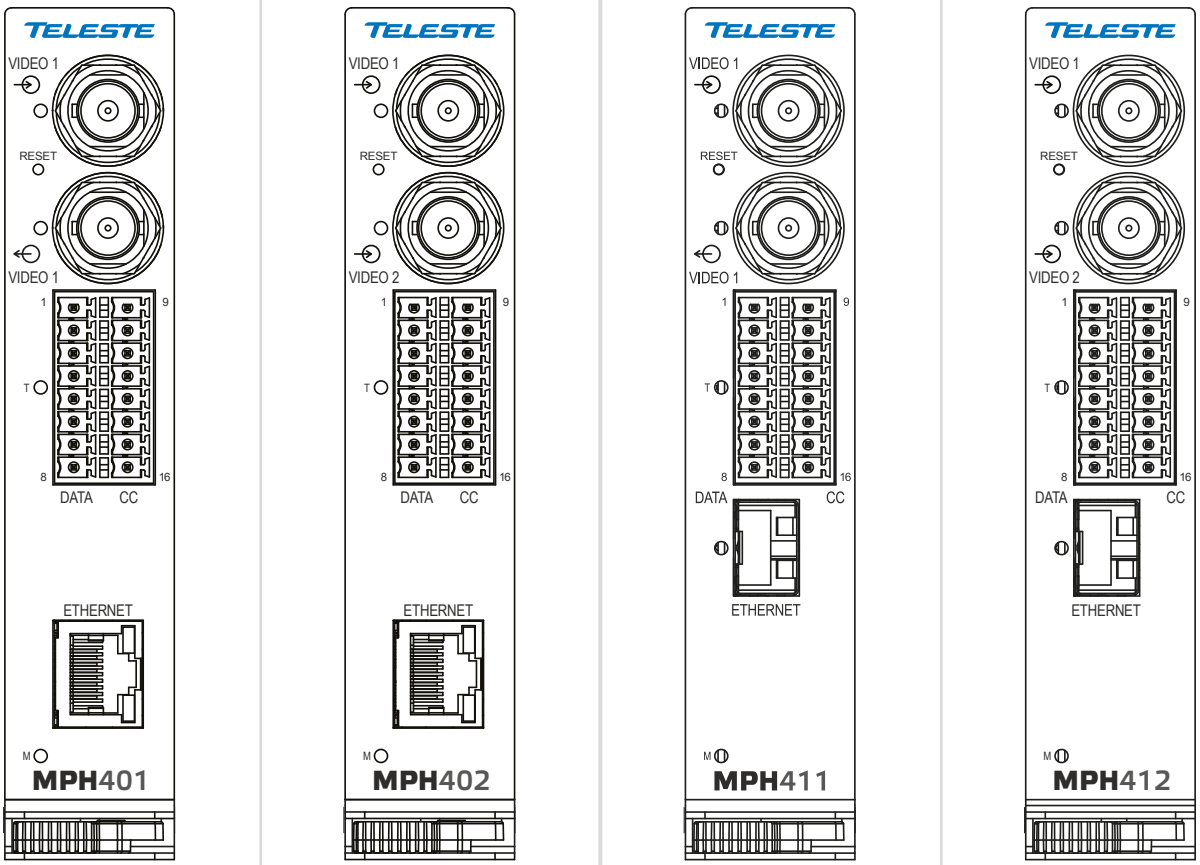
One video input.

Two video inputs.

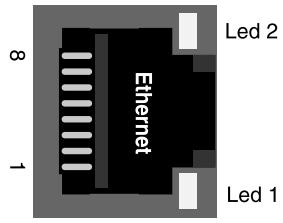
Stand-alone.



Rack-mounted.



Ethernet Interface



Electrical Ethernet connector (RJ-45).

Led	Colour	Mode
2	Green	Link up
	Blinking Green	Traffic
	OFF / Dark	No link
1	Orange	1000 Mbps
	OFF / Dark	100 Mbps

Ethernet port's led indicator operation (RJ-45 connector).

Led	Colour	Mode
SFP	Green	Link up
	Blinking Green	Traffic
	OFF / Dark	No link

Ethernet port's led indicator operation (when SFP optical connector).

***Note**! 100BASE-FX SFP module is always supported, 1000BASE-X SFP module has to be activated with the required license (MLH241).*

Ethernet connections

MPH encoder supports both **Fast Ethernet** and **Gigabit Ethernet** connection speeds. Ethernet interface type is either a **fixed electrical** (copper), or has support for a small form-factor pluggable transceiver (SFP) module. Supported SFP transceivers are specified by Teleste. Please see the latest lits of available products.

Fixed electrical interface

The electrical Ethernet connector type is a RJ-45 female. The connector is fixed (except Gigabit model with GTA/GTR type of SFP). Depending on the model, the Ethernet interface speed is 10/100BASE-T (Fast Ethernet) or 10/100/1000BASE-T (Gigabit Ethernet).

Power over Ethernet (PoE) option

MPH100 series encoders supports PoE standard (802.3af). This means that the encoders can be powered through the LAN cable (CAT5) without the need of individual power supplies.

Requirements for the use of PoE:

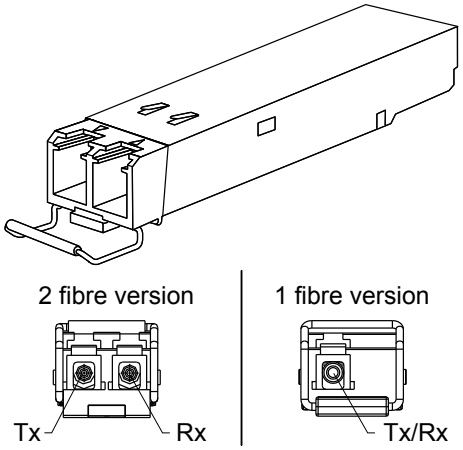
- A Power over Ethernet (PoE) compliant switch or hub.
- MLH251 license activation.

Optical interface

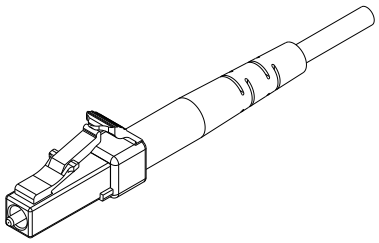
The optical Ethernet interface is type of a small form-factor pluggable (SFP). SFP modules for optical Ethernet operation are available with a variety of different types, allowing users to select the suitable module for to provide the required optical reach over the available optical fibre type. The optical connector type is **LC** (single or dual). Depending on the model, the Ethernet interface speed is 100BASE-F (Fast Ethernet) or 1000BASE-X (Gigabit Ethernet). The optical output level is constant and cannot be adjusted.

When installing the fibre optic cable, do not exceed the minimum bending radius when connecting cable to the system.

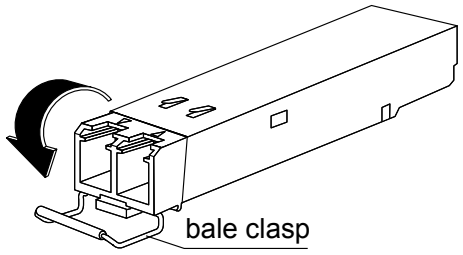
Optical Ethernet connection meets class 1 laser safety requirements of IEC 60825-2: 2004 and US department of health services 21 CFR 1040.10 and 1040.11 (1990) when operated within the specified temperature, power supply and duty cycle ranges.

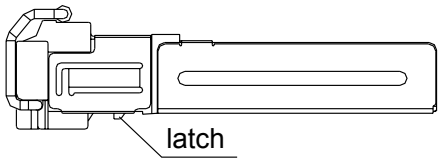


SFP plug-in optical transceiver module.



Optical connector is the type of LC.





SFP module's locking release points.

How to unplug or plug-in the SFP transceiver module

If your up-link port requirements change, simply unplug the existing SFP module, and plug-in the new module. The SFP transceiver modules must be installed before the encoder is powered on.

The SFP transceiver module has a bale-clasp latch that makes easier to install or remove the module. Protect the SFP module by inserting a clean dustplug into the module after you remove the fiber cable. Be sure to clean the optic surfaces of the fiber cable before you plug the cable into another module. When using 2 fibre version SFP, select carefully the correct optical port for TX and RX operation.

To unplug and plug-in the SFP module, follow these steps

1. Open the bale clasp on the SFP module by pressing the clasp downward until it is in a horizontal position.

2. Use a small flat-blade screwdriver or other long, narrow instrument to push on the hinge pin to unlock the SFP cage latch.

3. Grasp the SFP module by the bale clasp and gently pull it out of the SFP cage.

To plug-in the module:

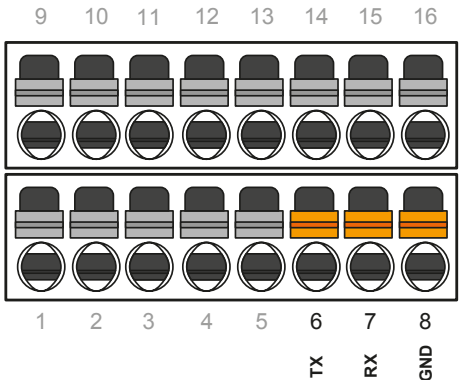
1. Orient the transceiver with the bale clasp on the bottom, close the bale clasp by pushing it up over the transceiver, then gently insert the transceiver into the port until it clicks into place.

***Note**! Reboot the device when the SFP is changed.*

Some generic notes for successfull optical connections:

- Ensure that the fiber patch cord is damage-free (fiber condition can be easily checked by a visible laser tester)
- Do not exceed the minimum bending radius of the fibre
- Avoid sharp corners on cable shelves and in cable management in overall
- Make sure that correct optical connectors are used
- Open connectors are always secured by dustcaps during maintenance
- Always before mating clean all connectors (wet cleaning by high purity alcohol & drying, or dry cleaning with reel-based lint-free wipes, fiber adapters may require special ferrule end-face cleaning tools)
- Before making any visual inspections ensure that system has been shutdown or no optical power is present
- For fault finding at least a optical power meter is required, a complex fiber cable environment may require use of an OTDR equipment

Management Interface



PC/ PSION	D9 female	Screw terminal	MPH encoder
Receive data	2	6	Mgmt output
Transmit data	3	7	Mgmt input
System ground	5	8	Ground

Local management connection (CLI) and management cable (**CIC506**) pinout (D9 female/screw terminal).

General

MPH encoders support web user interface (WebUI), ONVIF configuration interface and command line user interface (CLI) for various configuration purposes.

WebUI

MPH series video encoders can be fully configured using Web user interface (WebUI). You can access the Web user interface via web browser.

ONVIF

MPH series video encoder support ONVIF (Open Network Video Interface Forum) global interface (version 1.02).

CLI – Command Line Interface

MPH series video encoder include a command line interface (CLI) for configuration purposes. The CLI is a text-based interface that allows the user to interact with the operating system by entering commands and optional arguments. CLI is accessible through any terminal emulator application (e.g. Hyper Terminal or PuTTY). The command structure is the same for all session types. A typical CLI usage is to access the device IP address settings. By default the data channel 2 is set for CLI usage. The data channel 2 can be set to normal RS232 data mode with WebUI when needed.

Note! *Data 2 channel can be set either general RS232 data transport mode or CLI mode (not simultaneously). The default factory setting is CLI mode (Hard and soft factory reset restores the data channel 2 to the CLI mode).*

Local CLI connection

The **local CLI session** can be establish via data channel 2 by using a serial data connection (RS232) cable (type Teleste CIC506).

Note! *Data 2 port must be set to CLI mode .*

Remote CLI connection

Over the IP network you can make Telnet or SSH connection to open the command line interface remotely. SSH protocol secures your data session.

Web user interface (WebUI)

General

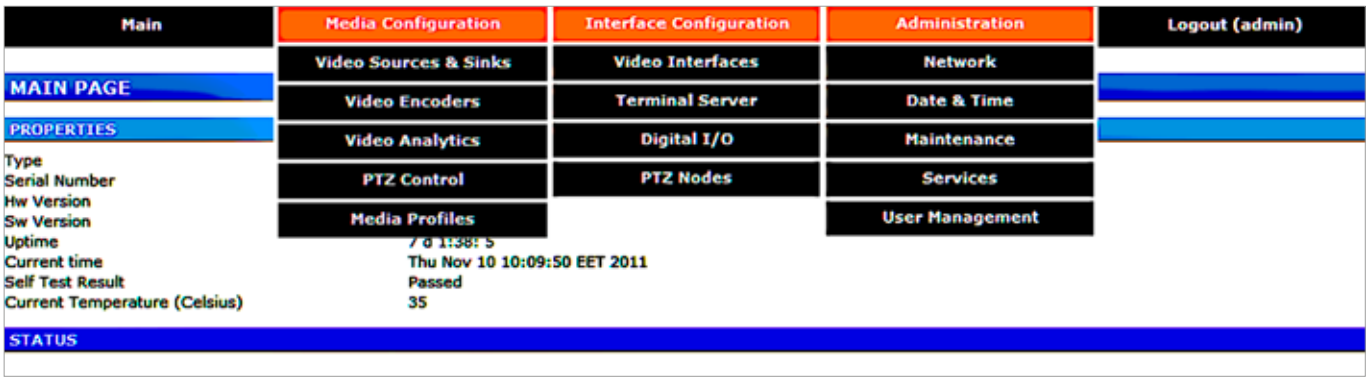
The **MPH** series video encoders can be fully configured using Web user interface (WebUI). You can access the Web user interface via your web browser, eg. Mozilla Firefox (recommended), Internet Explorer, Apple Safari and Google Chrome. The Secure HTTP (HTTPS) feature is supported in MPH encoders.

System requirements for WebUI

- Network connection
- Ethernet cable
- Browser installed (Mozilla Firefox recommended)

Operation

Web user interface consists of several menus and pages. Only one page can be loaded at the same time. You can open a page by clicking the related menu (see picture below).
The Web user interface has the following menu structure:



The information on configuration pages is shown in data fields or boxes. The settings can be changed in the data fields and boxes having white background. The unavailable or read-only options are grayed out. Place the cursor in the desired data field or box and enter a new setting. Settings are entered by ticking a checkbox or clicking on a radio button, by selecting from a pull-down list or by scrolling digits with the help of spin buttons.

Press keyboard's F5 button to refresh the WebUI page view.

When changing the settings, always click Save button to confirm settings.

By clicking this button on a page you can see more settings.

Starting WebUI session

To create a WebUI session, first enter the device IP address into the web browser's address bar (see section Device's IP address). The following LOGIN window appears on the screen. Enter the required username and password (see bottom) in the fields and then click Login to continue --> Web user interface's MAIN PAGE appears on the screen.

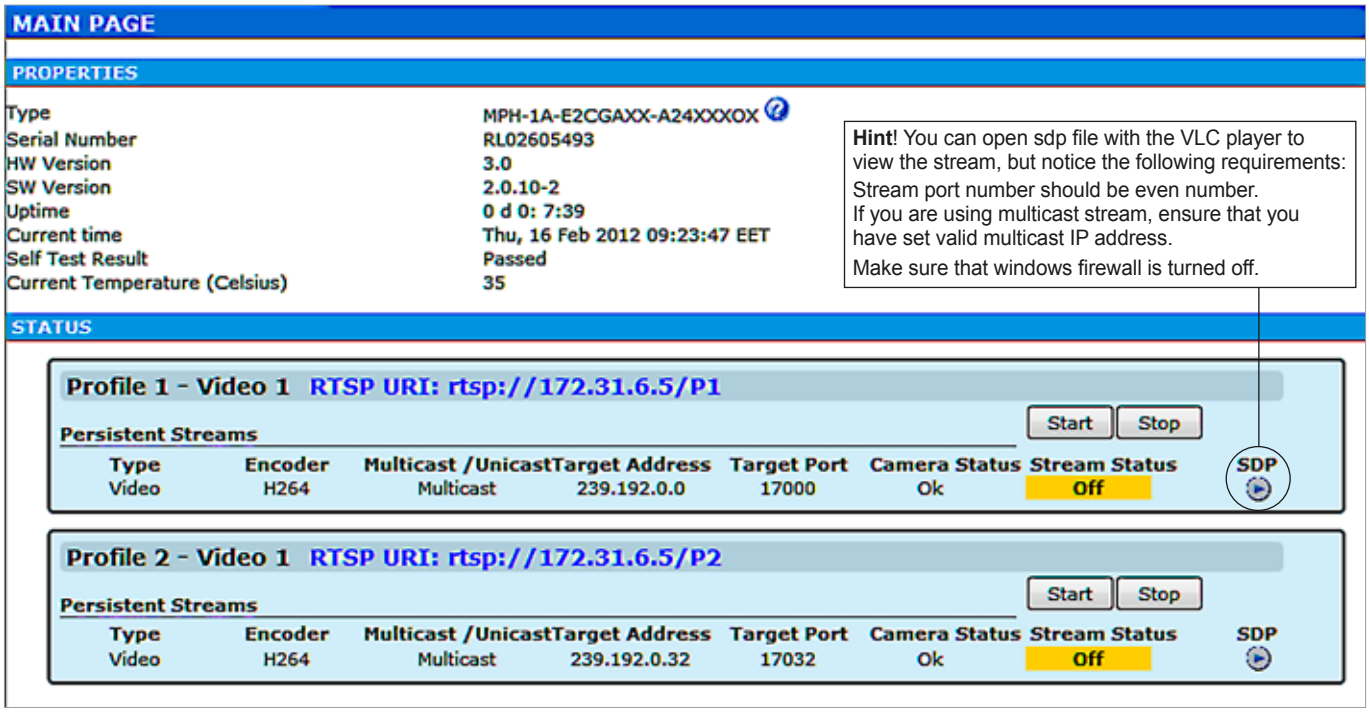
The Web user interface session to **MPH** series video encoder is now activated.

Login window with the default username and password (for administrator).

User levels and permissions

The user management supports three different user levels of which each has specific priviledges as shown below. The individual usernames, passwords and approved user level can be changed via the WebUI and CLI.

Page	Operation	User	Operator	Administrator
Main	General Access	x	x	Read and write access to all pages and all settings
	SDP download	x	x	
	Log download	x	x	
	Start/Stop	x	x	
	RTSP link copy	x	x	
Video Encoder	General Access	-	x	
	Save	-	x	
	Cancel	-	x	
Maintenance	General Access	-	x	
	Backup	-	x	
	Restore	-	x	
	Reboot device	-	x	
	Soft factory reset	-	x	
	Hard factory reset	-	-	
	Software upload	-	-	
	Software download	-	-	
	License install	-	-	
User Management	General Access	x	x	
	Save	x	x	
	Cancel	x	x	
	Change password	x	x	
	Change user group	-	-	
	View/Edit other users	-	-	
	Add User	-	-	


MAIN PAGE
PROPERTIES
Type
Serial Number
HW Version
SW Version
Uptime
Current time
Self Test Result
Current Temperature (Celsius)
MPH-1A-E2CGAXX-A24XXXOX
RL02605493
3.0
2.0.10-2
0 d 0: 7:39
Thu, 16 Feb 2012 09:23:47 EET
Passed
35
Hint! You can open sdp file with the VLC player to view the stream, but notice the following requirements:
Stream port number should be even number.
If you are using multicast stream, ensure that you have set valid multicast IP address.
Make sure that windows firewall is turned off.
STATUS
Profile 1 - Video 1 RTSP URI: rtsp://172.31.6.5/P1
Start
Stop
Persistent Streams
Type Encoder Multicast /Unicast Target Address Target Port Camera Status Stream Status SDP
Video H264 Multicast 239.192.0.0 17000 Ok Off
Profile 2 - Video 1 RTSP URI: rtsp://172.31.6.5/P2
Start
Stop
Persistent Streams
Type Encoder Multicast /Unicast Target Address Target Port Camera Status Stream Status SDP
Video H264 Multicast 239.192.0.32 17032 Ok Off

MAIN PAGE

The MAIN PAGE is opened after the WebUI session has been established to the **MPH100/400** series video encoder.

MPH100/400 encoder contains six (6) encoding profiles, which can be individually configured. On this page you can see each profile's current status and start/stop their video streaming.

Type: Device type (configuration map code)
Serial Number: Device serial number
HW Version: Device hardware version
SW Version: Device firmware version
Uptime: Device uptime
Current time: Device current time
Self Test Result: Device test result
Current Temperature: Current ambient temperature

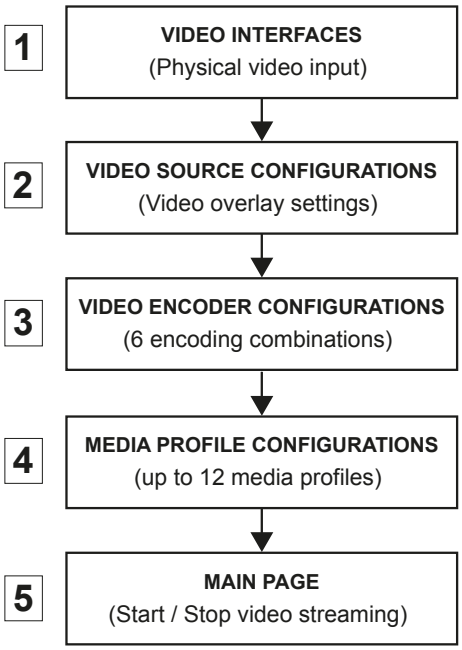
STATUS

Here you can see each profile's current status.
Type: Stream type (Video)
Encoder: Encoding format (H.264/MJPEG/MPEG-4,MPEG-2)
Multicast /Unicast: Video transmission mode (multicast/unicast)
Target Address: Multicast: Multicast IP address / multicast group
Unicast: IP address of receiving decoder
Target Port: UDP port number
Camera Status: Camera status (Ok/No signal)
Stream Status: Video stream status (On/Off)
SDP: Link to SDP file (Session Description Protocol). The SDP file contains stream parameters that are meant for 3rd party applications (e.g. SW decoders) to open/view the stream.

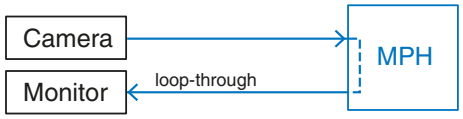
Download short term logs: Debug log file
Download long term logs: Debug log file

Configuring Video Channels

***Note!** MPH encoder has automatic NTSC/PAL video format detection. When changing the video format, the device must reboot.*



Step-by-step flowchart how to configure video channel in the MPH encoder.



MPH101/111 and **MPH401/411** contains one video input (with loop-through).

***Note!** One channel MPH encoder's second video connector is loop-through port for an analog monitor. It is designed to transmit the same analog video signal out that is received from video input.*

MPH102/112 and **MPH402/412** contains two video inputs.

Video connection

MPH encoder is available in one and two video input models. One channel model has equipped with additional loop-though output connector. The video connector type is a BNC female. The video input impedance is 75 Ω. The nominal input level is 1 Vpp. Video inputs are equipped with dual colour VIDEO indicator led's on the front panel. Video port settings can be configured from web user interface (WebUI).

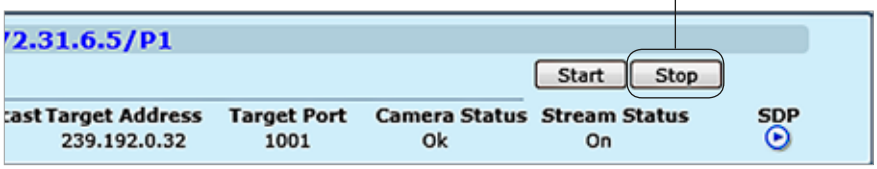
Led	Colour	Video mode
Video 1	Green	Video connector is used as video input and is locked to valid video signal
	(Short) Blinking Green	The video input is not used in any active media profile, but is locked to video
	Orange	Video connector is used as video input, but no valid video signal is detected
	Off / Dark	Power is OFF or device is restarting.

Led	Colour	Video mode
Video 2	Green	Video connector is used as video input and is locked to valid video signal
	(Short) Blinking Green	The video input is not used in any active media profile, but is locked to video
	Orange	Video connector is used as video input, but no valid video signal is detected
	Off / Dark	Power is OFF or device is restarting, or configured for loop-through output (1-ch version only)

Video channel configuration

MPH is an ONVIF compliant encoder and video channel configuration is designed according to ONVIF standard.

***Note!** Before modifying the configuration of a video profile, make sure that video stream is stopped on the MAIN page.*



Video streaming methods

Video input is the physical video connector (BCN female) available for CVBS signal. Naturally each video input can be connected to a camera or any other standard PAL or NTSC video source.

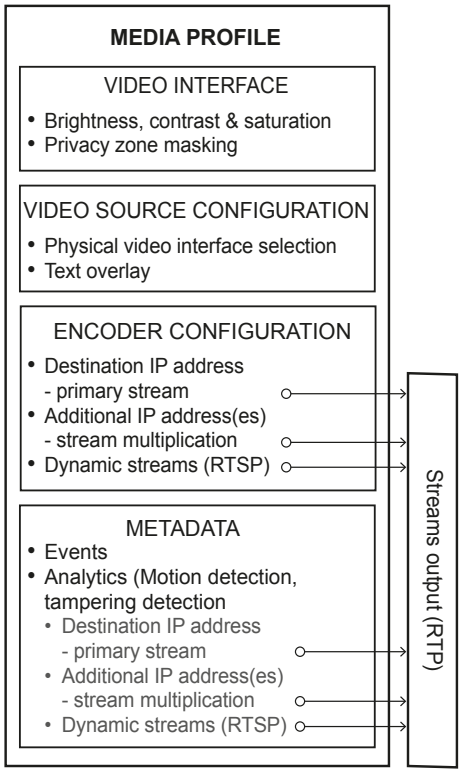
Media profile

MPH series encoders has a total of six (6) media profiles. Each media profile can be set separately for individual resolution, frame rate, GOP structure and bitrate, within the processing power of the device.

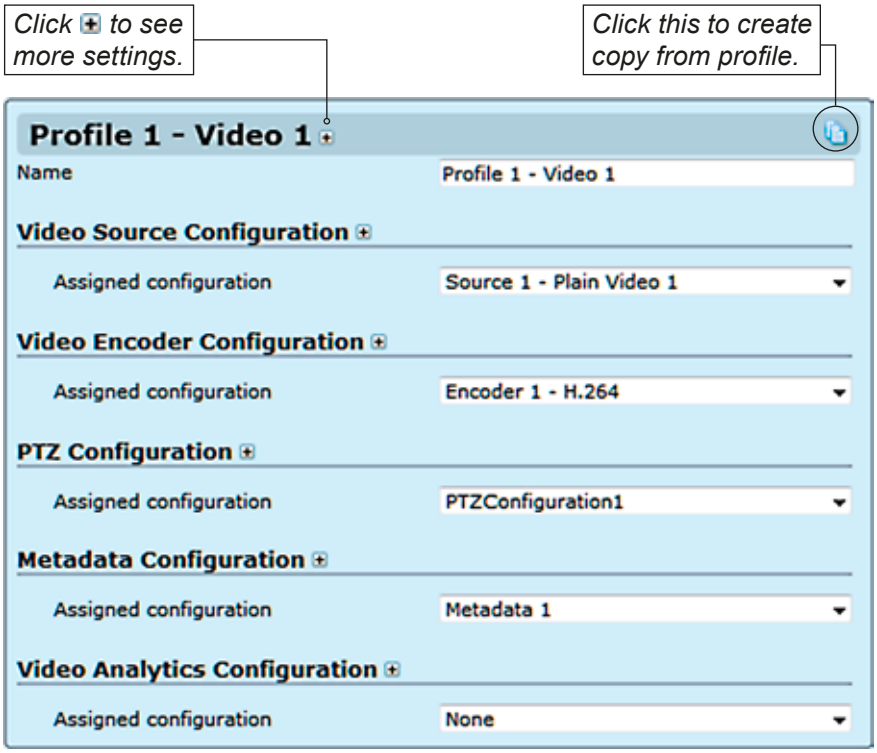
Click "**Media Profiles**" under the Media Configuration menu. **Media Profile Configurations** page appears on the screen. On this page you can associate virtual video sources with physical video inputs and encoding profiles.

By default this page contains six different media profiles. It is possible to create up to twelve (12) different media profiles on this page.

Note! *It is not possible to change encoding format /resolution and video input settings on this page.*


MEDIA PROFILE
VIDEO INTERFACE
• Brightness, contrast & saturation
• Privacy zone masking
VIDEO SOURCE CONFIGURATION
• Physical video interface selection
• Text overlay
ENCODER CONFIGURATION
• Destination IP address - primary stream
• Additional IP address(es) - stream multiplication
• Dynamic streams (RTSP)
METADATA
• Events
• Analytics (Motion detection, tampering detection
• Destination IP address - primary stream
• Additional IP address(es) - stream multiplication
• Dynamic streams (RTSP)
Streams output (RTP)

Description how the video encoder, a video source and video input is assembled to the media profile.



MEDIA PROFILE CONFIGURATIONS page.

Name: User defined alias name for media profile (max 63 chars).

Video Source Configuration

Assigned configuration: Select assigned video source configuration.

Video Encoder Configuration

Assigned configuration: Select assigned video encoder configuration.

PTZ Configuration

Assigned configuration: Select assigned PTZ configuration.

Metadata Configuration

Assigned configuration: Select assigned metadata configuration.

Video Analytics Configuration

Assigned configuration: Select assigned video analytics configuration.

1. Video Interfaces

Click "**Video Interfaces**" under the Interface Configuration menu. **Video Interfaces** page appears on the screen. In this page you can see the number of physical video inputs available and adjust the brightness, contrast and saturation values for them.

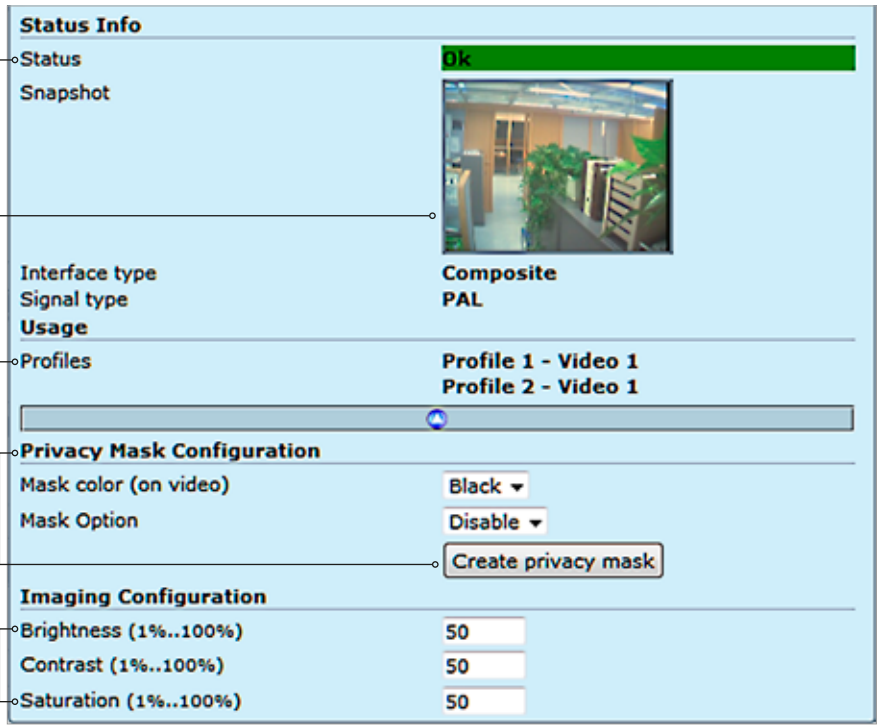
Video status. The colour bar reflect the status of the video. Green colour bar means that there is video signal. Yellow colour bar with text tells that there is no video.

Screenshot from the current video.

Here you see how the media profile is assigned to a video interface.

When monitoring an area for security, there may be certain parts within the camera's field of view that need to be kept private. Masking is a feature that enables these areas to be concealed from view.

Brightness, Contrast and Saturation values for the video channel.

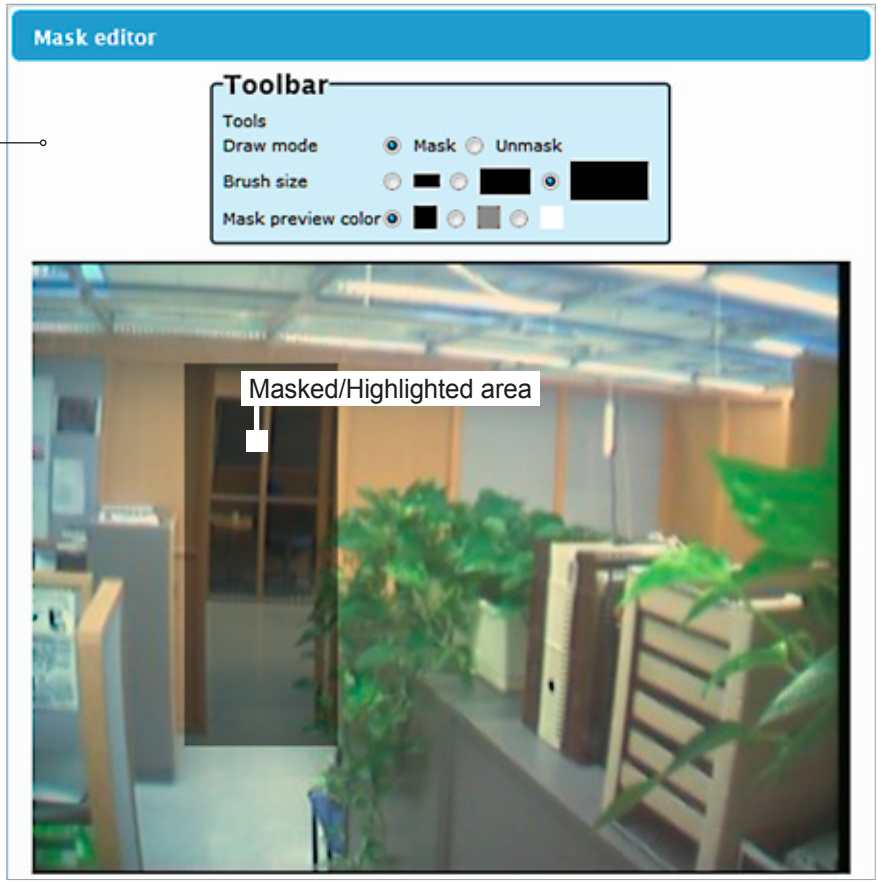


VIDEO INTERFACES page.

User can configure the encoder to automatically hide certain areas with a mask, which can be adjusted in terms of its colour.

Mask editor shows a screenshot from camera view and overlays a translucent mask on the image.

Draw mode: Masked (highlighted) areas are private areas that are removed (concealed) from camera's view.
Brush size: Select brush size for masking.
Mask color: Depending on the brightness of the image snapshot, appropriate mask preview color can be chosen. This color affects the preview on mask editor only and doesn't reflect on the streaming video.



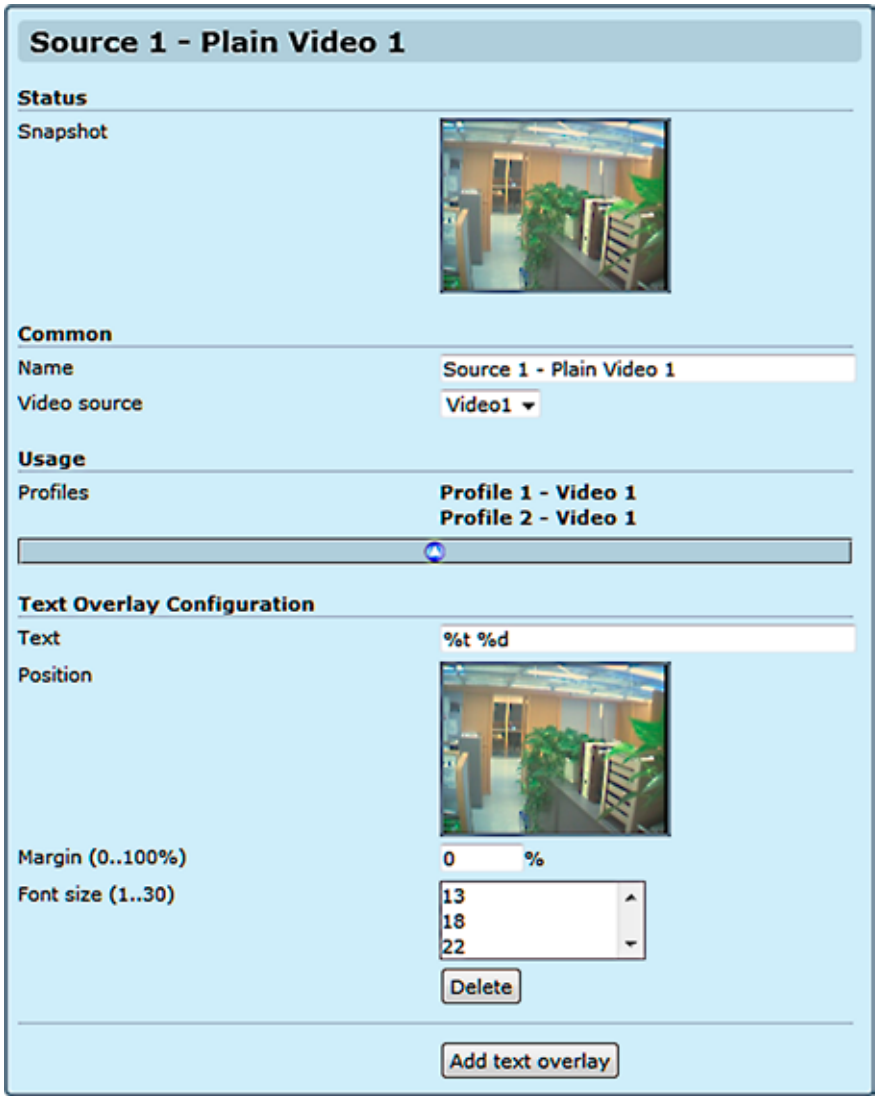
MASK EDITOR page contains settings for hiding certain areas from the encoded picture.

2. Video Source and Sinks

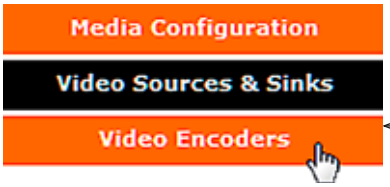
Click “**Video Source and Sinks**” under the Media Configuration menu. **Video Source Configurations** page appears on the screen. Video overlay settings can be changed on this page, you can enter a text and time/date on the video.

***Note**! Date and time settings can be changed from Date & Time page.*

There are four different virtual video sources available for video inputs. This feature allows you to set four different views with/without video overlay content.



VIDEO SOURCE CONFIGURATIONS page.

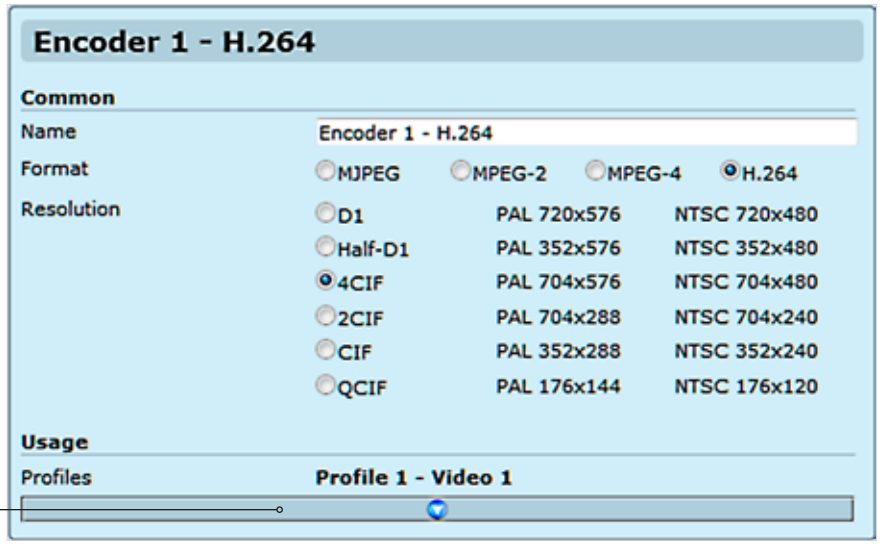


3. Video Encoders

Click "**Video Encoders**" under the Media Configuration menu. **Video Encoder Configurations** page appears on the screen. Video encoding settings can be configured on this page, e.g. select format (MJPEG, MPEG-2, MPEG-4 and H.264), set resolution, bit rate, frame rate and multicast IP/port settings for each profile.

This page contains (by default) six different customizable encoding profiles. This feature allows you to set six different video encoding combinations, each with their own settings.

On this page you can also add multiplied multicast/unicast streams from each encoder.



Click this to see more settings.

VIDEO ENCODER CONFIGURATIONS page.

Common

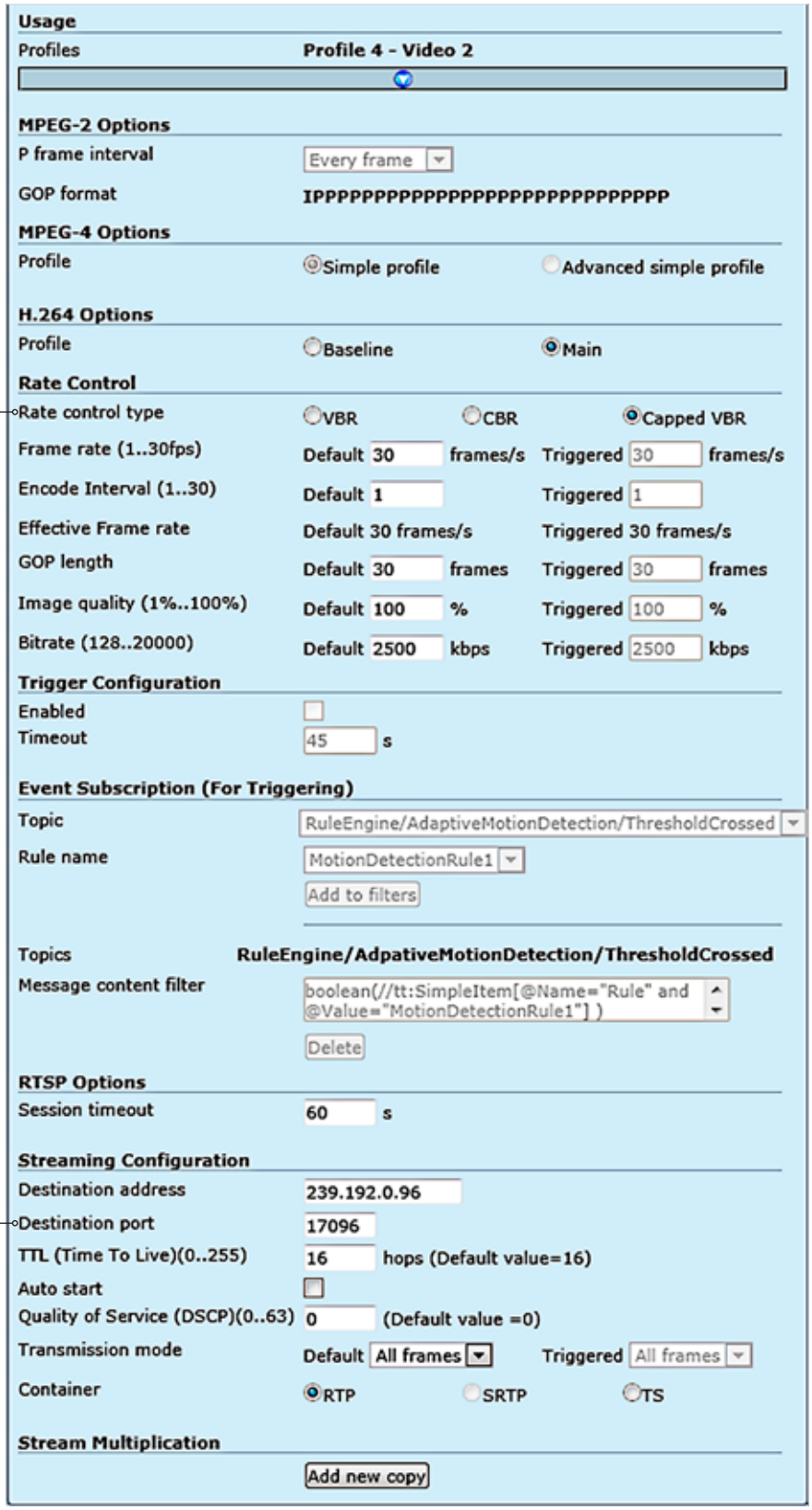
Name: User defined alias name for video profile (max 63 chars).
Resolution: Video resolution, either QCIF/CIF/2CIF/4CIF/Half D1 or D1.

***VBR** (Variable Bit Rate) video aims at constant quality, but as the bit rate fluctuates over time.*

***CBR** (Constant Bit Rate) video fluctuates in quality, while its multiplexing behaviour is easy to predict.*

*Because in unconstrained VBR video the bit rate fluctuation might be too large, **capped VBR** video is proposed as an alternative. Capped VBR video aims at a constant quality, but when in certain intervals this requires a too high bit rate, the bit rate is limited (i.e.,capped) in order to support more video flows on the links, at the expense of a quality reduction.*

***Note!** Only even port numbers can be used for RTP, and then the following odd port number shall be used for RTCP (RFC 1889).*



VIDEO ENCODER CONFIGURATIONS page.

Usage

Profiles: Here you see how the media profile is assigned to a video source.

MPEG-2 Options:

P frame interval: There are three options; Every frame = IP, Every second frame = IBP, Every third frame = IBBP.

GOP format: MPEG-2 GOP format.

MPEG-4 Options:

Simple profile: Simple Profile (SP) is recommended only for decoder compatibility. Interlacing toolsets are not used.

Advanced simple profile: Advanced Simple Profile (ASP) Level 5 enables Macroblock-Adaptive Frame/Field Coding (MBAFF) which offers better image quality and better compression ratio with interlaced video signal. Recommended choice when interlaced stream is selected (D1 and Half-D1 resolutions).

H.264 options:

Baseline: Baseline Profile (BP) Level 3 is recommended only for decoder compatibility. Interlacing toolsets are not used.

Main: Main Profile (MP) Level supports field encoding which which offers better image quality and better compression ratio with interlaced video signal. Recommended choice when interlaced stream is selected (D1 and Half-D1 resolutions).

Rate control:

Rate control type: Defines video bitrate mode. There are three options available, variable bitrate (VBR), constant bitrate (CBR) or capped VBR. Rate control is a trade off between quality fluctuations and bit rate variability.

Frame rate (1...30fps): Defines video frame rate (adjustable 1...30fps for PAL/NTSC).

Encode Interval (1...30): Defines encoding frame interval; for instance when encoding interval is 1, all frames are encoded, value 2 means, every second frame is encoded.

GOP length: Specifies the order in which intra- and inter-frames are arranged. The GOP is a group of successive pictures within an encoded video stream. Each coded video stream consists of successive GOPs. From the pictures contained in it, the visible frames are generated. For instance if you 25 FPS video stream, GOP= 25 means one I-frame per full frame. GOP = 13 means two I-frames per full frame. GOP = 5 means 5 I-frames, 20 p-frames per second

Image quality (1%...100%): Encoded video image quality, can adjust in VBR or capped VBR mode.

Bitrate (128...20000): Encoded video bitrate, 128Kbps...15Mbps.

Trigger configuration:

Enabled:

Timeout:

Event subscription (for triggering):

Topic:

Rule name:

Topics:

Message content filter:

RTSP options:

Session timeout: Timeout for RTSP session

Streaming Configuration:

Destination address: Destination IP address. **Multicast**: Multicast IP address / multicast group. This multicast IP address has to be same at both encoder and corresponging decoders. **Unicast**: IP address of receiving decoder.

Destination port: UDP port number (0...65536). This number has to be same at both encoder and decoder pairs.

TTL (Time To Live)(0...255): Time-To-Live for video packets = number of hops that a packet is permitted to travel before being discarded by a router.

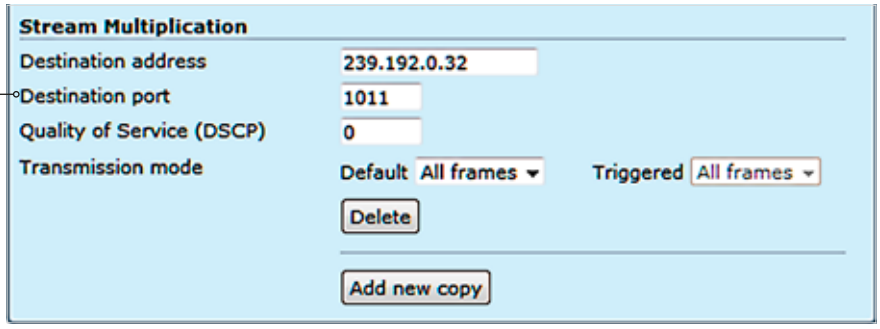
Auto start: Video streaming will automatically start after reboot. Changing autostart does not immediately start or stop streams.

Quality of Service (DSCP)(0...63): (Differentiated Services Code Point) field lets you set bits in the stream IP header allowing a network device to apply rules such as how the packet is forwarded in the network and QoS (Quality of service) management.

Transmission mode: **All frames** is the default option and enables the encoder to pass (stream) all frames (I and P frames). **I frames** enables encoder to send only I-frames, meaning filtering all P frames. **Paused** = pause streaming.

Container: RTP (Real-time Transport Protocol), SRTP (Secure Real-time Transport Protocol) or TS (MPEG transport stream).

Note! *Only even port numbers can be used for RTP, and then the following odd port number shall be used for RTCP (RFC 1889).*



Video stream multiplication

Each video encoding profile can be assigned with five (5) different destination addresses (primary stream and additional streams). These addresses can be freely set to unicast, multicast or a combination of these. In addition there is a tick box that enables to filter out P-frames from each output stream for low frame rate applications. This approach provides for a very cost efficient dual streaming in situations where the low frame rate stream is a direct subset of the higher frame rate stream. In practise this means that the number of I-frames is the common nominator. As an example, one MPH102 unit can stream (unicast or multicast) 2 x D1@25fps for monitoring and 4 x 2CIF@3fps (unicast or multicast) for recording simultaneously. The precondition is, the number of I-frames per second in the primary stream should match to frame rate of the low frame rate stream. In the example above the I-frame interval of the primary stream would need to be 8 (GOP = IPPPPPPPIPPPPPPPIPP…) generating 3 I-frames per second thus resulting in 3fps stream when P-frames are filtered out. The use of multiple destination addresses up to a certain degree doesn't load the MPU; however one should take into account that the aggregate bit rate of all output streams does not exceed the capacity of the 100Mbps interface.

Stream multiplication:

Destination address: Destination IP address. **Multicast**: Multicast IP address / multicast group. This multicast IP address has to be same at both encoder and corresponging decoders. **Unicast**: IP address of receiving decoder.

Destination port: UDP port number (0...65536). This number has to be same at both encoder and decoder pairs.

Quality of Service (DSCP): Differentiated Services Code Point field lets you set bits in the stream IP header allowing a network device to apply rules such as how the packet is forwarded in the network and QoS (Quality of service) management.

Transmission mode: **All frames** is the default option and enables the encoder to pass (stream) all frames (I and P frames). **I frames** enables encoder to send only I-frames, meaning filtering all P frames. **Paused** = pause streaming.

Add new copy: Adds new copy from stream.

Video streaming performance

The following performance table shows the performance of MPH100/400 devices in encoding and streaming video signal per video input simultaneously.

Total video sessions = original video stream + multiplied streams.

SRTP (Secure Real-time Transport Protocol) = encrypted RTP stream.

De-interlacing is done by choosing right profile.

Configurations for single input in dual input devices (NTSC/PAL)										
MPEG-2/ MPEG-4/H.264 Encoder 1	MPEG-2/ MPEG-4/H.264 Encoder 2	MPEG-2/ MPEG-4/H.264 Encoder 3	MPEG-2/ MPEG-4/H.264 Encoder 4	De-interlace	Privacy zone masking	Motion detection	Tampering	Text overlay	Total sessions	SRTP sessions
D1 30fps 6Mbps	4CIF 30fps 6Mbps			30 fps	Yes			40 chars/ encoder	3	3
D1 30fps 6Mbps	4CIF 15fps 6Mbps			15 fps	Yes	QCIF 5fps	Yes	40 chars/ encoder	3	3
D1 30fps 6Mbps	2CIF 30fps 3Mbps				Yes	QCIF 5fps	Yes	40 chars/ encoder	3	3
CIF 30fps 1.5Mbps	CIF 30fps 1.5Mbps	CIF 30fps 1.5Mbps	CIF 30fps 1.5Mbps		Yes	QCIF 5fps	Yes	40 chars/ encoder	4	4
Configurations for single input in single input devices (NTSC/PAL)										
MPEG-2/ MPEG-4/H.264 Encoder 1	MPEG-2/ MPEG-4/H.264 Encoder 2	MPEG-2/ MPEG-4/H.264 Encoder 3	MPEG-2/ MPEG-4/H.264 Encoder 4	De-interlace	Privacy zone masking	Motion detection	Tampering	Text overlay	Total sessions	SRTP sessions
D1 30fps 6Mpbs	D1 30fps 6Mpbs	4CIF 30fps 6Mbps	4CIF 30fps 6Mbps	30fps	Yes	QCIF 5fps	Yes	40 chars/ encoder	8	4

Available video streaming performance for MPH100/400 series encoders.

Note! *Video traffic could overload Fast Ethernet throughput depending on number of streams/bitrate combination. Be sure that the configuration does not exceed Fast Ethernet port throughput. E.g. as an example: MPH102 number of encoded streams 32, bitrate 4000 kbps = 128 Mbps -> Fast Ethernet throughput is exceeded.*

***Note!** Minimum (Min) values may be smaller without any picture quality degradation.*

Recommended bitrates for **H.264** encoding.

Resolution	Bitrate (kbps)						
	Min*		Max	Recommended			
				Interlacing toolsets OFF		Interlacing toolsets ON	
	CBR	CapVBR		CBR	CapVBR	CBR	CapVBR
D1	1900	1900	5500	2500	2500	2800	2300
4CIF	1900	1900	5500	2500	2500	2800	2300
Half D1	1000	1000	3000	1400	1400	1700	1300
2CIF	1000	1000	3000	1400	1400		
CIF	500	500	1700	650	650		
QCIF	150	150	500	200	200		

Recommended bitrates for **MPEG-4** encoding.

Resolution	Bitrate (kbps)						
	Min*		Max	Recommended			
				Interlacing toolsets OFF		Interlacing toolsets ON	
	CBR	CapVBR		CBR	CapVBR	CBR	CapVBR
D1	2200	2200	6000	3500	3500	3200	3200
4CIF	2200	2200	6000	3500	3500	3200	3200
Half D1	1200	1200	3200	1900	1900	1800	1800
2CIF	1200	1200	3200	1900	1900		
CIF	600	600	2000	1000	1000		
QCIF	200	200	600	300	300		

Recommended bitrates for **MJPEG** encoding.

Resolution	Bitrate (kbps)						
	Min*		Max	Recommended			
				Interlacing toolsets OFF		Interlacing toolsets ON	
	CBR	CapVBR		CBR	CapVBR	CBR	CapVBR
D1	6000	6000	12000	8000	8000	8000	8000
4CIF	6000	6000	12000	8000	8000	8000	8000
Half D1	3000	3000	6000	4500	4500	4500	4500
2CIF	3000	3000	6000	4500	4500		
CIF	2000	2000	4500	2500	2500		
QCIF	600	600	1300	750	750		

Recommended bitrates for **MPEG-2** encoding.

Resolution	Bitrate (kbps)						
	Min*		Max	Recommended			
				Interlacing toolsets OFF		Interlacing toolsets ON	
	CBR	CapVBR		CBR	CapVBR	CBR	CapVBR
D1	2500	2500	6600	4600	4600	4200	4200
4CIF	2500	2500	6600	4600	4600	4200	4200
Half D1	1300	1300	3500	2500	2500	2300	2300
2CIF	1300	1300	3500	2500	2500		
CIF	700	700	2500	1300	1300		
QCIF	200	200	600	350	350		

Recommended GOP sizes for **H.264** encoding.

Rate Control Mode	GOP		
	Min	Max	Recommended
CBR	7	3000	60 -->
Capped VBR	7	3000	15 -->
VBR	7	3000	7 -->

Recommended GOP sizes for **MPEG-4** encoding.

Rate Control Mode	GOP		
	Min	Max	Recommended
CBR	7	120	60...120
Capped VBR	7	120	15...120
VBR	7	120	7...120

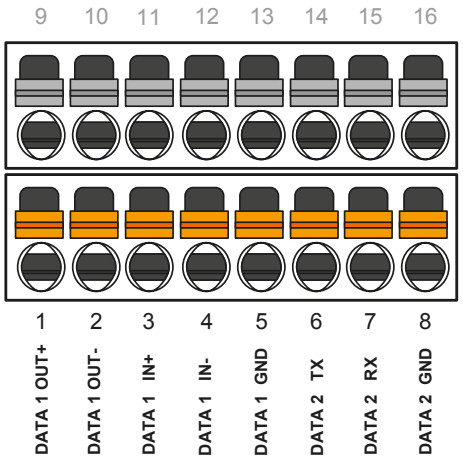
Recommended GOP sizes for **MPEG-2** encoding.

Rate Control Mode	GOP		
	Min	Max	Recommended
CBR	7	120	60...120
Capped VBR	7	120	15...120
VBR	7	120	7...120

	D1	Half D1	4 CIF	2 CIF	CIF	QCIF	
Field Encoding	Not available						**H.264 Base Profile (BP) Level 3**
Deinterlacer			x	One field used			
Field Encoding	x		Not available				**H.264 Main Profile (MP) Level 3**
Deinterlacer			x	One field used			
Field Encoding	x						**MPEG-2 Main Profile (MP) Main Level**
Deinterlacer			x	One field used			
MBAFF							**MPEG-4 Simple Profile (SP) Level 5**
Deinterlacer			x	One field used			
MBAFF	x						**MPEG-4 Advanced Simple Profile (ASP) Level 5**
Deinterlacer			x	One field used			
Field Encoding	x						**MJPEG**
Deinterlacer			x	One field used			
Type field value	0						
Type specific field values	1 & 2		0				

Supported interlace coding tools for the MPH video encoders.

Configuring Data Channels



Lower screw terminal connector on front panel is used for data connections.

Data connections

The MPH100/400 encoder provides two independent bi-directional data channels. Supported data modes for data channel 1 are **RS422**, **RS485-2w** and **RS485-4w**. Data channel 2 is fixed for **RS232** mode only. Data port settings can be configured from web user interface (WebUI) or Command Line Interface (CLI).

Data channel 1 is fully configurable and supports RS422, RS485 2-wire and RS485 4-wire modes .**ONVIF PTZ** service is only available from data channel 1, whereas data channel 2 is used either for RS232 data mode or command-line interface usage. Both channels support tunnelling protocol and can be connected to the PTZ controller application.

The default factory settings are:

- Data channel 1: **RS485-2w**
- Data channel 2: mode is set to **CLI** (Command Line Interface) usage

Pin	Signal	RS232	RS422	RS485-2w	RS485-4w
1	Data 1		OUT +		OUT +
2			OUT -		OUT -
3			IN +	IN/OUT +	IN +
4			IN -	IN/OUT -	IN -
5			GROUND	GROUND	GROUND
6	Data 2	TX			
7		RX			
8		GROUND			

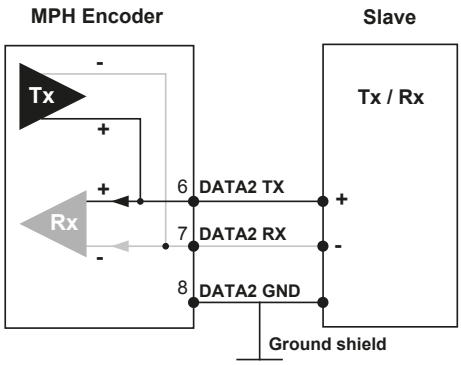
Data connector's pinout and supported data types.

Led	Colour	Mode
T	Green	Active Connection. Terminal server TCP connection is established.
	Blinking Green	On stream.
	OFF / Dark	No stream.

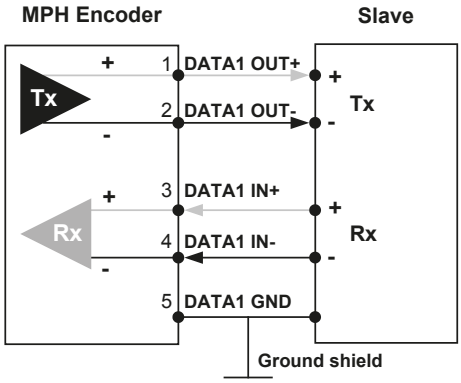
T - (terminal server) Led indicator operation. This LED indicates the status of Terminal server activity on RS422/485 port.

	Data 1	Data 2
Tunnelling protocol	x	x
ONVIF PTZ protocol	x	
RS232		x
RS422, RS485	x	
Command line interface		X

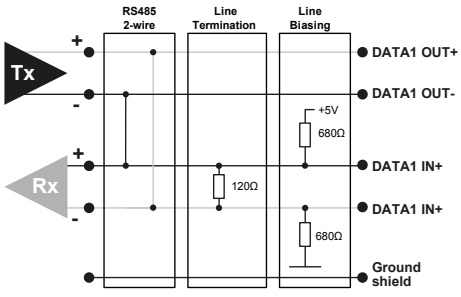
MPH unit provides two data channels for PTZ cameras on Terminal server page.



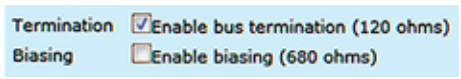
RS485-2w data connection diagram.
A 2-wire RS485 network is implemented as a half-duplex system using single twisted-pair cabling. This means that data can flow in both directions but only in one direction at a time.



RS422 / RS485-4w data connection diagram.
A 4-wire RS485 network can be implemented as a full-duplex system using two twisted-pair buses where each bus is used for each direction of transmission.



MPH's internal functionality for data channel 1 termination and biasing.



Termination and biasing settings view from WebUI.

Data type descriptions

RS232 is an unbalanced data format (i.e. the signal wire working against a reference – ground). Simplex RS232 requires two connections (signal and ground). Full-duplex RS232 requires three connections (signal TX, signal RX and ground).

RS422 is a balanced data format. Simplex RS422 requires three data connections (+/- and ground). Full-duplex RS422 requires five data connections (in+/in-, out+/out- and ground).

RS485 is used for full-multipoint communications where multiple transceiver devices may be connected to a single twisted-pair signal cable. Most RS485 systems use a Master/Slave architecture, where each Slave unit has a unique address and responds only to packets addressed to that unit. Packets are generated by the Master (e.g. CCTV controller keyboard), which periodically 'polls' all connected Slave units (e.g. CCTV camera receiver units). The Slave unit that has been addressed then sends the appropriate reply packet back to the Master. Slave units have no means of initiating communication without the risk of a collision so they need to be assigned the 'right to transmit' by the Master (by polling). RS485 exists in two versions, 2-wire and 4-wire.

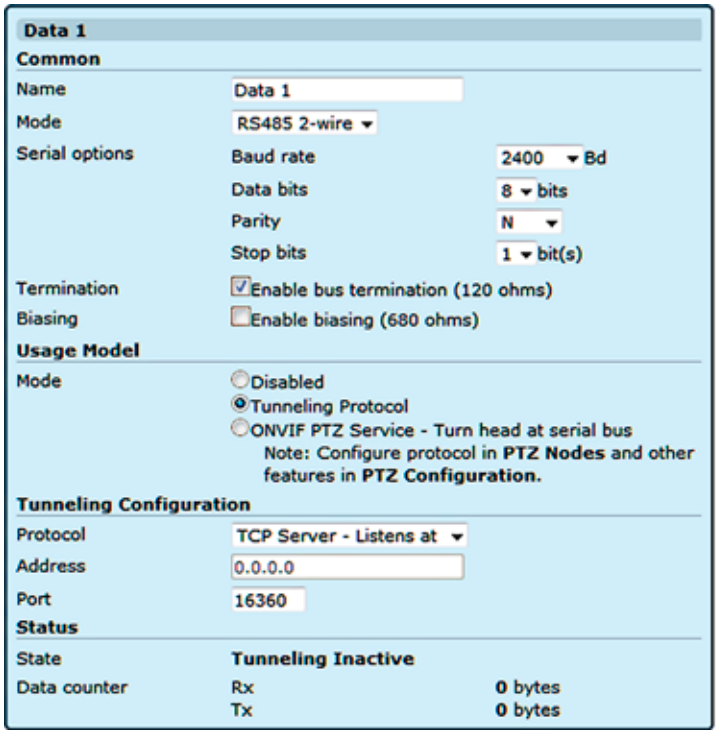
Data termination and biasing

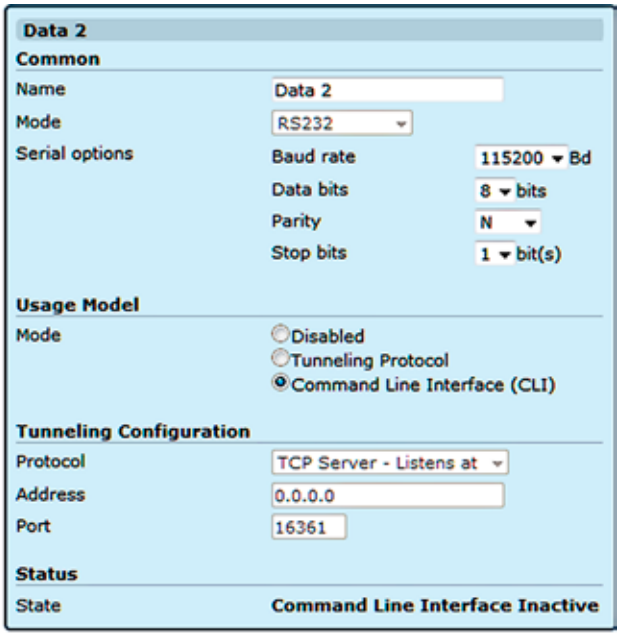
Termination is used to match impedance of a node to the impedance of the transmission line being used. When impedance are mismatched, the transmitted signal is not completely absorbed by the load and a portion is reflected back into the transmission line. If the source, transmission line and load impedance are equal these reflections are eliminated.

Biasing -> the lines will be biased to known voltages and nodes will not interpret the noise from undriven lines as actual data; without biasing resistors, the data lines float in such a way that electrical noise sensitivity is greatest when all device stations are silent or unpowered.

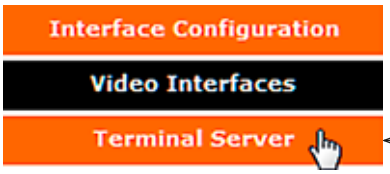
Data mode	Input termination options
RS232	None
RS422	No term (with failsafe) Line termination (120 Ω)
RS485 - 2w	No term (with failsafe) Hard bias (forced 680 Ω line biasing) Line termination (120 Ω)
RS485 - 4w	No term (with failsafe) Hard bias (forced 680 Ω line biasing) Line termination (120 Ω)

Data input termination options for data channels. Data termination connects 120 Ω between pins. Hard bias connects 680 Ω (+input) to +5V and GND (- input).





Data interfaces configuration



An analog PTZ camera can be controlled remotely over an IP network via the MPH encoder's serial port (RS-232/422/485). MPH encoders supports two ways to control PTZ camera, ONVIF PTZ service and transparent RS-data tunneling.

Click "**Terminal Server**" under the Interface Configuration menu. **Terminal Server - Data Ports** page appears on the screen. Data port settings can be changed on this page.

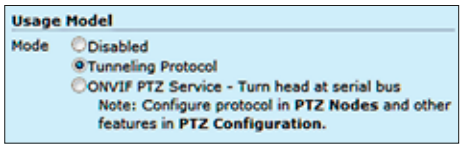
Data 1 & 2 (WebUI)

Common

Name: User defined alias name for data interface (max 64 chars)
Mode: Data connection protocol towards the external device, options are RS422, RS485 2-wire and RS485 4-wire (Data 1) and RS232 (Data 2)
Baud rate: Data channel connection speed (range 600...230 400 bps)
Data bits: Number of data bits. Options are 5, 6, 7, 8 & 9
Parity: A data-checking technique, which uses an extra bit, Options are Even, Odd & N (None)
Stop bits: Options are 1 or 2
Termination: Enabled/disabled (Data 1). The dafault setting is enabled.
Biasing: Enabled/disabled (Data 1). The dafault setting is disabled.

Usage Model

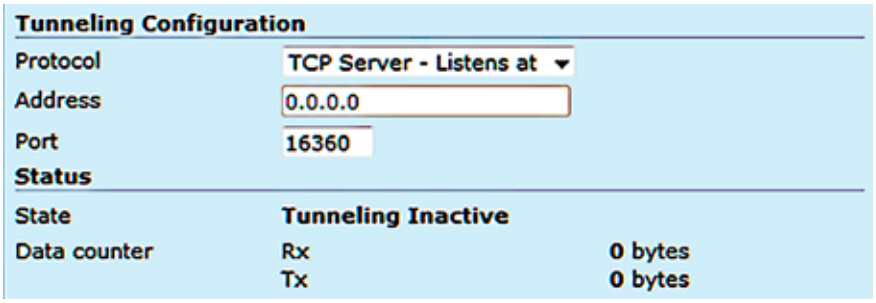
Mode: Data usage mode. By MPH encoder you can control PTZ cameras via two protocols, Tunnelling Protocol and OnVIF.


Usage Model
Mode
Disabled
Tunneling Protocol
ONVIF PTZ Service - Turn head at serial bus
Note: Configure protocol in PTZ Nodes and other features in PTZ Configuration.

Data port mode can be set to the tunneling protocol usage from the Terminal Server page.

Tunneling Protocol

Tunnelling Protocol enables you to establish point to point connection between encoder, decoder and management system. There are three options, TCP server, TCP client and UDP multicast.



Tunneling Configuration

Protocol: Client / server based connected is done by TCP client / server protocol. If the encoder is set to be “TCP Server”, then the decoder or management system must be set to “TCP Client”, or vice versa. In UDP multicast mode, you can use a joystick to control multiple cameras and connection can be point to multipoint.

Address: Destination IP address

Port: UDP port number (0...65535). This number has to be same at both encoder and decoder pairs

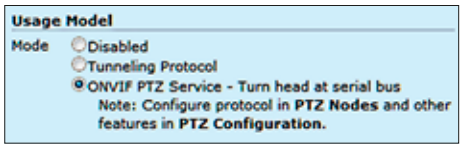
Status

State: Shows data port’s state.

***Note**! In order to have correct channel status information, you can check the followings:*

- *Device address is configured correctly in PTZ nodes page.*
- *Serial Port configuration : connection mode (RS-485 4-wire, etc), Baud rate, and parity. in terminal server page.*
- *PTZ configuration is added to a media profile. PTZ configuration “PTZ1” by default is added to media Profile 1.*

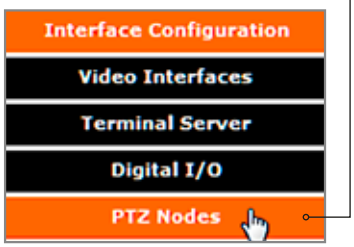
Data counter: Data port’s traffic counter.

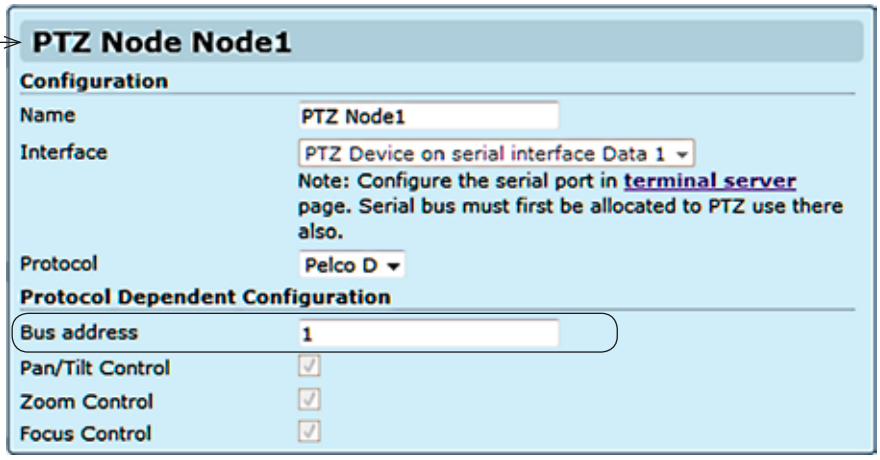

Usage Model
Mode
Disabled
Tunneling Protocol
ONVIF PTZ Service - Turn head at serial bus
Note: Configure protocol in PTZ Nodes and other features in PTZ Configuration.

1. In order to activate the ONVIF PTZ protocol, data port mode must be first set to the ONVIF PTZ service usage from the Terminal Server page.

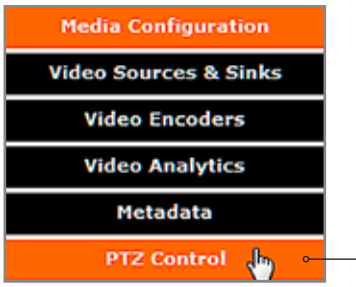
ONVIF PTZ service

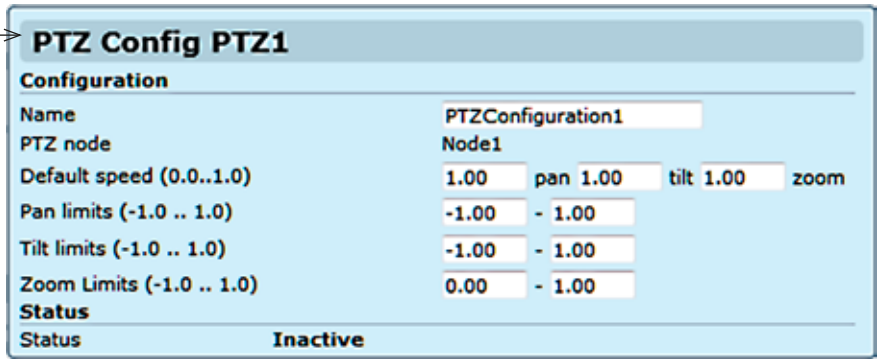
ONVIF PTZ service lets you control the camera from ONVIF client application. ONVIF PTZ service is available from data channel 1. It means that MPH converts ONVIF PTZ commands to Pelco D commands and transmits that to the camera via Data channel 1.

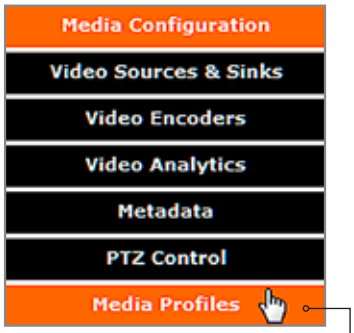




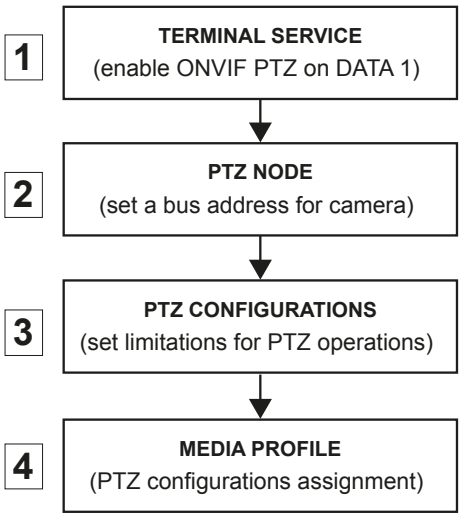
2. Next on the PTZ Nodes page you need to set a Bus address for the camera, you can have two cameras using the same Data port with different bus addresses.

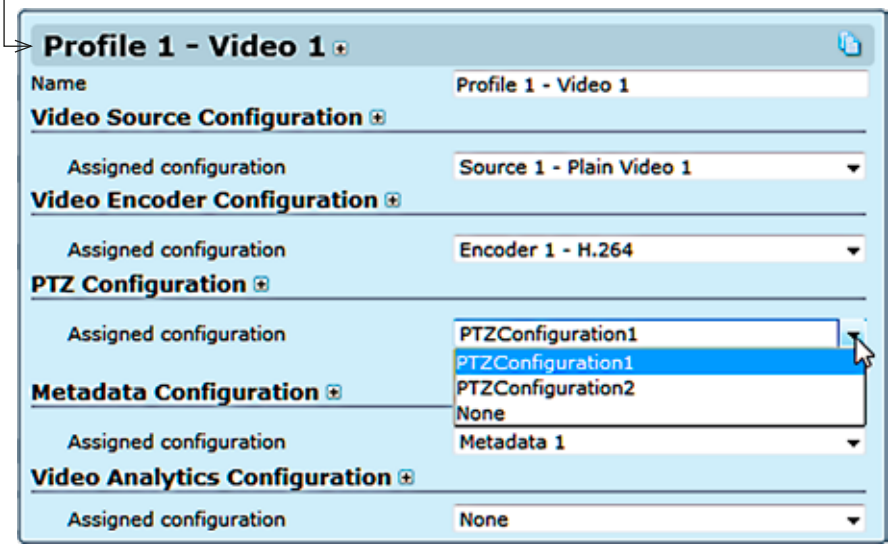






3. Then on the PTZ configurations page you can set limitations for PTZ operations. For each PTZ node you can limit speed, pan, tilt and zoom.

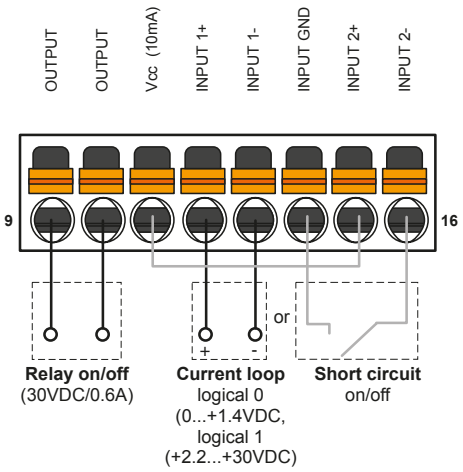




Step-by-step flowchart how to configure ONVIF PTZ data 1 channel in the MPH encoder.

4. Finally on the Media profiles page you need to assign the PTZ configuration to the media profile where the camera is connected to.

Configuring Contact Closure Channels



Upper screw terminal connector (pins 9...16) on front panel is used for contact closure connections.

Contact closure loop (CCL) connection

The **MPH100/400** series video encoders provide two inputs and one contact closure output channel line.

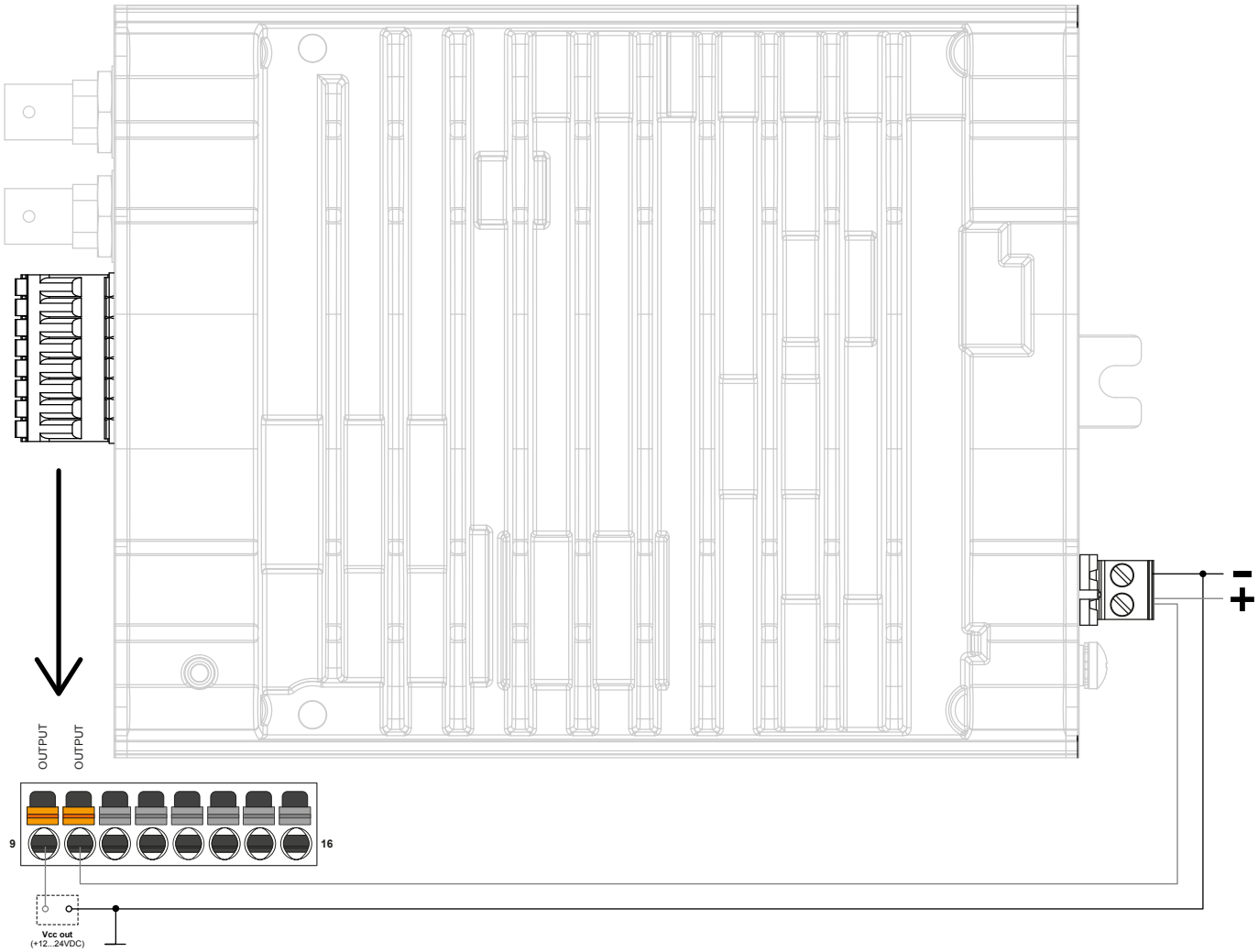
Contact closure inputs

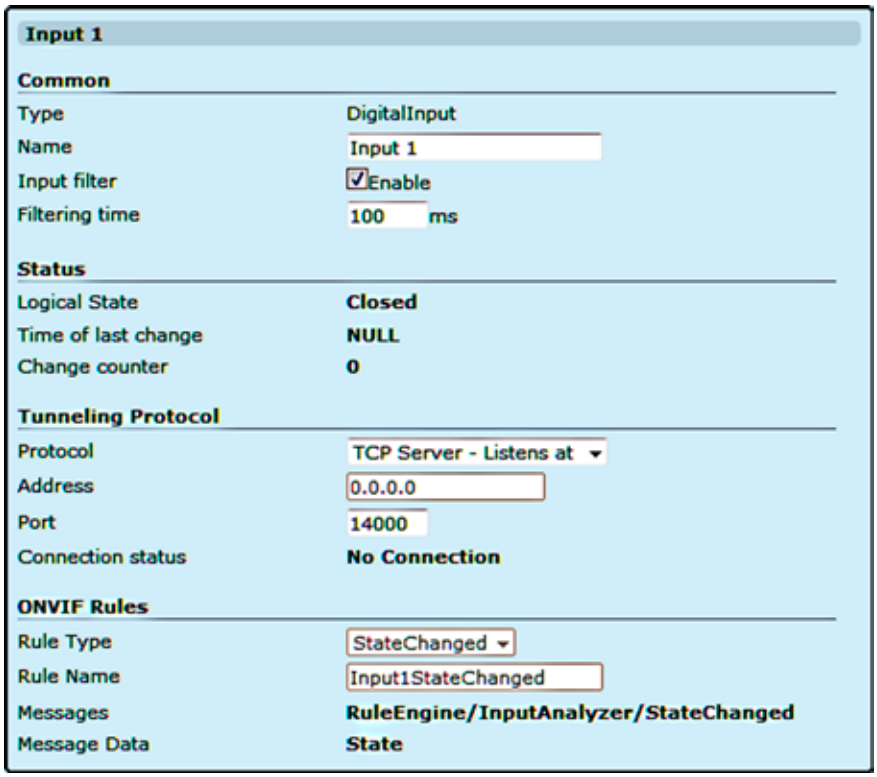
There are two different CC input connection types. First one is for a normal short circuit which is called “dry contact closure”. Dry contact closure enables you to switch ON & OFF input signals between connector’s contact pins (internal power source). Second type is called “Optoisolated” current loop input signals (logical 0 = 0.0VDC...+1.4VDC and logical 1 = +2.2VDC...+30.0VDC) between contact pins (external power source). Input pins nominal current consumption is 3 mA.

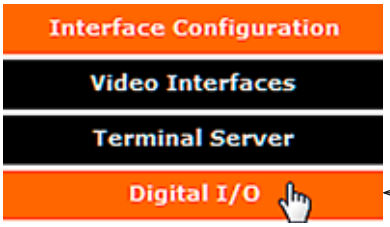
Contact closure output

CC output is a normal relay on/off - output signal (30V / 0.6A) between connector’s contact pins.

***Note**! If votlage output is needed from output, do not use Vcc (10mA) pin for it. Instead use external voltage source or device power supply for it. See an example connection bottom.*







Contact closure interfaces configuration

Click “**Digital I/O**” under the Interface Configuration menu. **Contact Closure / Inputs & Outputs** page appears on the screen. Contact closure settings can be changed on this page.

Contact closure input 1 & 2

Common

Name: User defined alias name for contact closure interface (max 64 chars)

Input filter: Monitors how many state changes happen (from close to open or vice versa) during the time frame given by “Filter Time” parameter. If during this time frame CC input state changes more than once, the input state is set as “unstable”.

Filtering time: Time frame for “Input Filter” (100...2000 ms).

Status

Logical State: The default state for CC input (open/closed).

Time of last change: Shows the time when the last cc state was changed.

Change counter: Shows the total number of state changes that has been registered by a given input CC.

Tunneling protocol

Protocol: IP connection type. There are three options: “TCP Client - Connects to” , “TCP Server - Listens at” and “UDP multicast - Sends to”.

Address: Destination IP address.

Port: UDP port number (0...65535). This number has to be same at both encoder and decoder pairs.

Connection status: Shows connection status. The status can be active, disabled or no connection.

ONVIF Rules

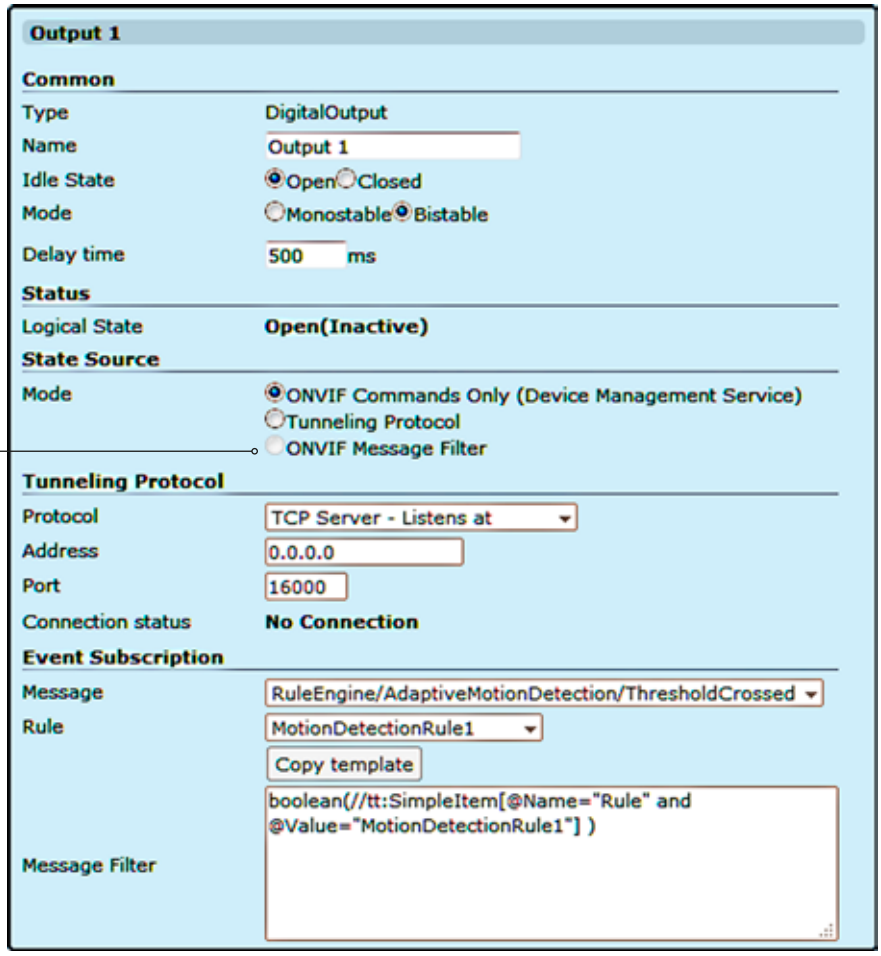
Rule Type:

Rule Name:

Messages:

Message Data:

Note! *When Contact closure tunneling is used, Bistable mode is only applicable. Monostable mode is applicable when relay output is controlled by ONVIF commands from ONVIF client.*



Contact closure output

CC output can be controlled either with ONVIF Commands (SetRelay-OutputState) or by receiving state using tunneling protocol.

Common

Name: User defined alias name for contact closure interface (max 64 chars)

Idle State: User defined default standby mode for contact closure output pins.
Open means that the output relay is open in inactive mode.
Close means the output relay is closed in inactive mode.

Mode: Contact closure output state has two modes; Monostable and Bistable.
Bistable – After changing the state, the relay remains in this state.
Monostable – After changing the state, the relay returns to its idle state after the specified time.

Delay time: Time period in monostable mode when state changes back to the idle state.

Status

Logical State: Current CC output state.

State Source

Mode: Definition how to control the CC output. Options are:
ONVIF Commands only, Tunneling Protocol and ONVIF Message Filter

Tunneling protocol

Protocol: There are three connection types. Point-to-point (Client/server) based connection which is done by TCP client / server protocol. If the encoder is set to be **TCP Server**, then the decoder or management system must be set to **TCP Client**, or vice versa. In UDP multicast mode, you can control multiple devices and connection can be point to multipoint.

Address: Destination IP address

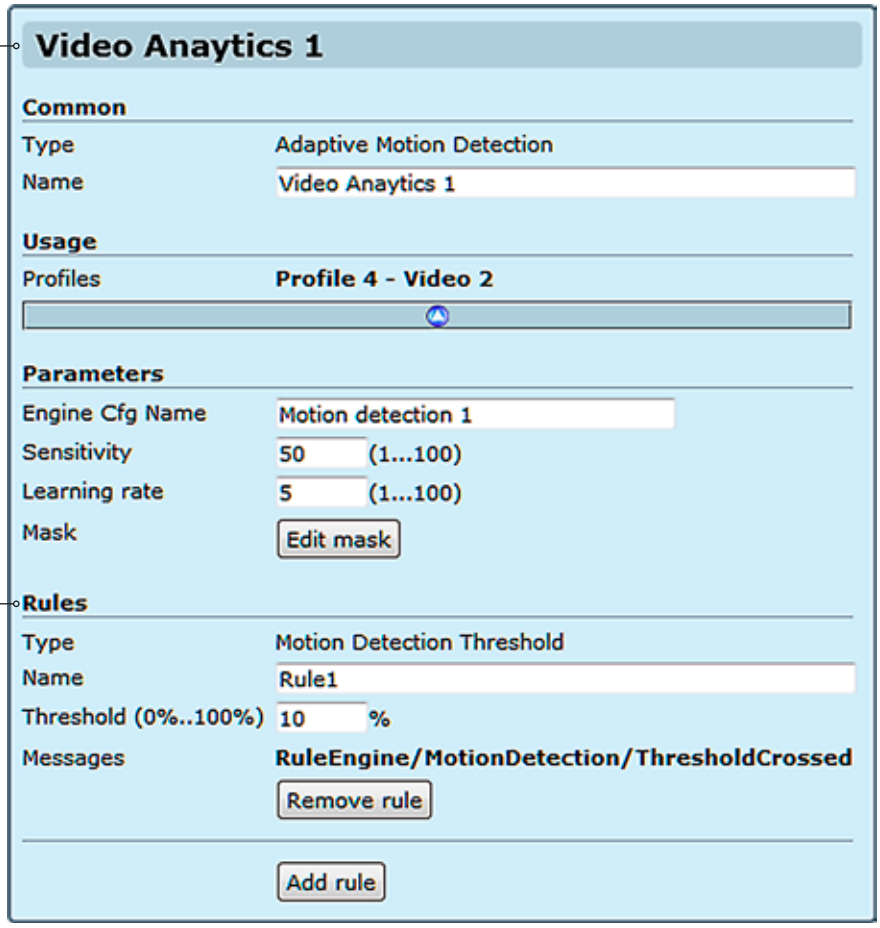
Port: UDP port number (0...65535). This number has to be same at both encoder and decoder pairs

Connection status: Current CC connection status

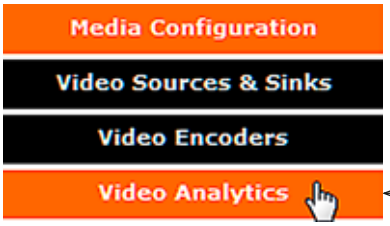
Event Subscription

Video Analytics configuration is activated if the configuration is included in at least one of the profiles.

***Note**! Profile does not need to be activated when configuring video analytics settings.*



User can add/remove rules (maximum of 5 rules are supported per configuration).



Video Analytics Configurations

Click "**Video Analytics**" under the Media Configuration menu. **Video Analytics Configurations** page appears on the screen. Video Analytics settings can be configured on this page. All the parameters can be configured dynamically i.e. when video analytics configuration is active.

Common

Type: Adaptive motion detection.

Name: User defined name for video analytics configuration object (max 64 chars).

Usage

Profiles: Not Supported.

Parameters

Engine Cfg Name: User defined name for video analytics engine configuration (max 64 chars).

Sensitivity: Motion detection algorithm sensitivity. Range is 1-100%

Learning time: Motion detection algorithm learning rate.

Mask: When monitoring an area for security, there may be certain parts within the camera's field of view that need to be kept private. Masking is a feature that enables these areas to be concealed from view.

Rules

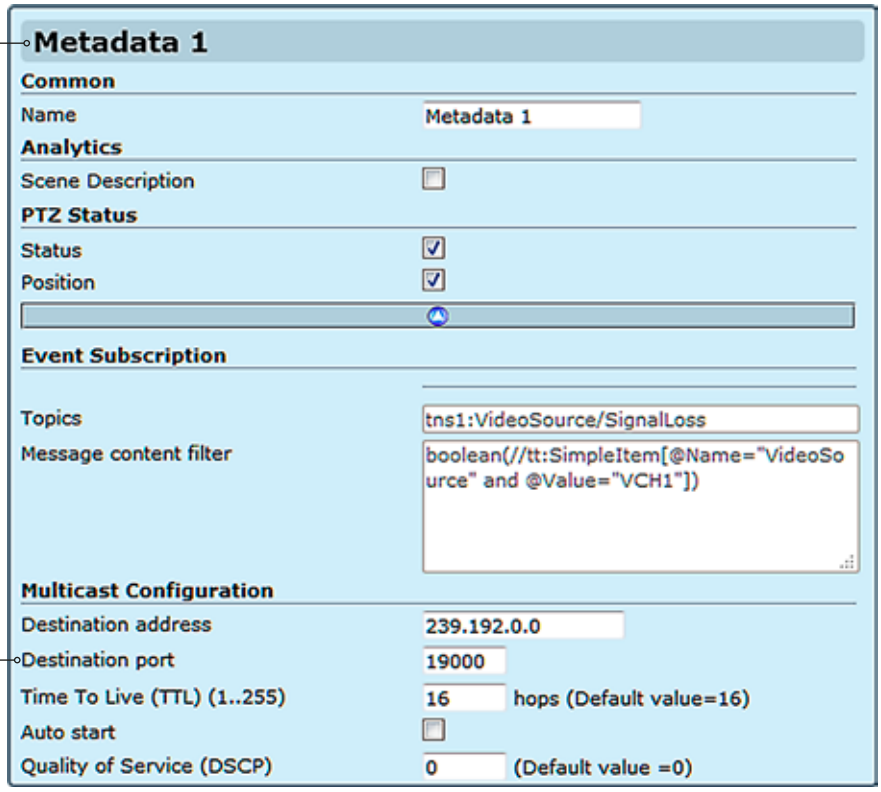
Type: Motion detection threshold.

Name: User defined name for rule (max 64 chars).

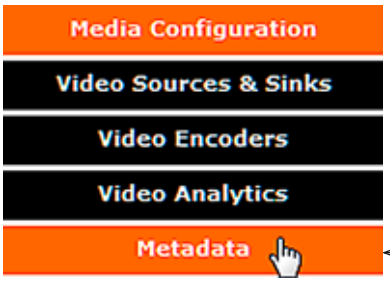
Threshold (0%..100%): Threshold percentage to trigger rule. Range is 0-100%

Messages:

Metadata is a data channel and one of the Onvif features which can carry events, PTZ status, and/or video analytics data for network video devices.



***Note!** Only even port numbers can be used for RTP, and then the following odd port number shall be used for RTCP (RFC 1889).*



***Note**! Parameters cannot be changed when streaming is active.*

Metadata Configurations

Click "**Metadata**" under the Media Configuration menu. **Metadata Configurations** page appears on the screen. You can add a metadata configuration to an existing media profile, adding a metadata configuration to a profile means that streams using that profile contain metadata. Four metadata configurations are supported. In addition to video analytics information, metadata can transmit PTZ camera status and position to the Onvif client. Carrying other events such as "loss of video signal" is done by metadata channel. Metadata transmits video analytics information like motion detection over RTP stream in XML format. Currently MPH transmits motion detection information, PTZ camera status (feedback) and video loss event over metadata channel.

Common

Name: User defined alias name for metadata configuration (max 64 chars).

Analytics

Scene Description: Enable/disable scene description. When enabled, adds video analytics results from each analyzed frame to metadata. With motion detection this includes amount of motion detected and defined threshold level.

PTZ Status

Status: Enable/disable PTZ control status.

Position: Enable/disable PTZ camera position.

Event Subscription Event subscription defines which events are included to metadata stream.

Topics: Event subscription topics.

Message content filter: Event subscription message content filter.

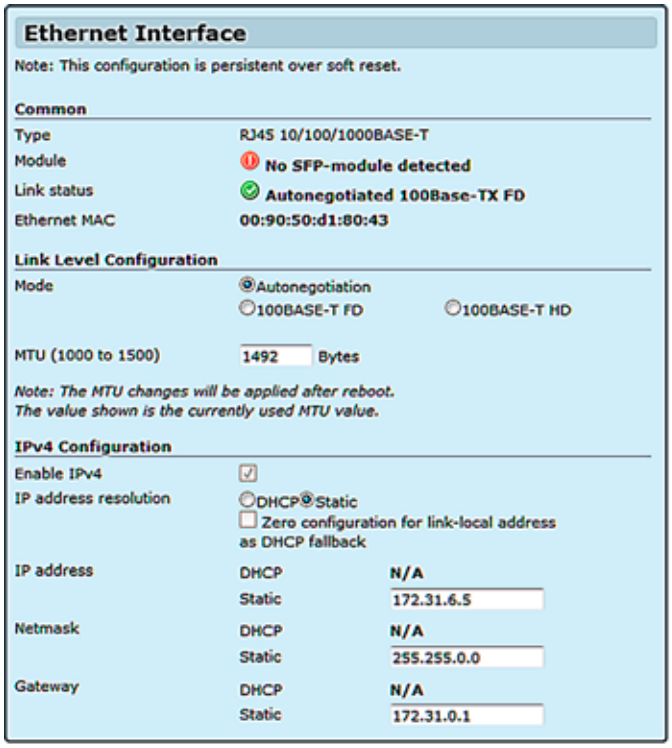
Multicast Configuration

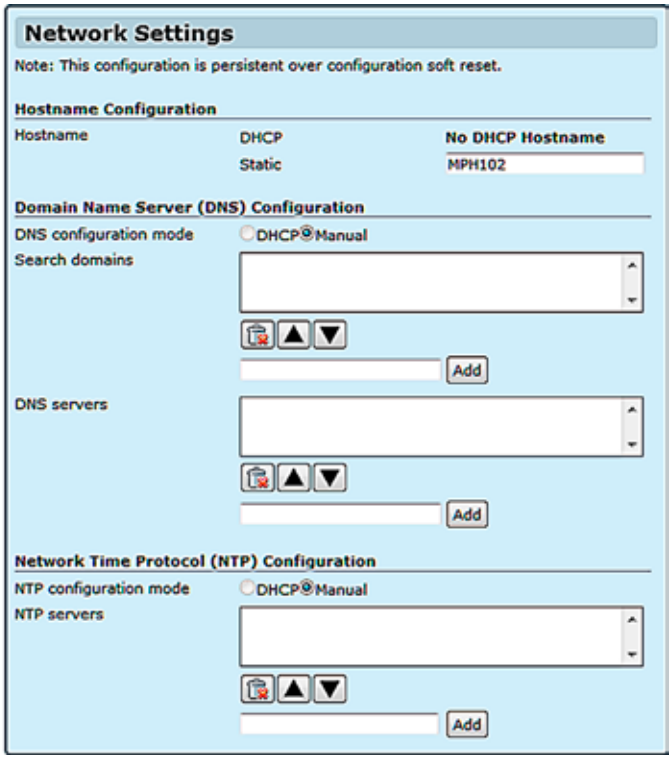
Destination address: You can set a multicast address and port number for a Metadata stream, **Destination port**: the multicast address can be the same as video stream multicast address but with different port number.

Time To Live (TTL) (1..255): Multicast Time-To-Live for metadata packets.

Auto start: If enabled, metadata streaming starts automatically after reboot (does not immediately start or stop streams).

Quality of Service (DSCP): Defines QoS class in differentiated services (DiffServ) traffic management. DSCP (Differentiated Services Code Point) is a field in the IP headers that affects the priority of packet in the network per hop basis.





Network Settings

Click "**Network**" under the Media Configuration menu. **Network Settings** page appears on the screen. Device's network settings can be changed on this page.

Ethernet Interface

Common

Type: Device's Ethernet Interface type.
Module: Shows the status of SFP module.
Link status: Shows the current link status and connection type.
Ethernet MAC: MAC address of the device.

Link Level Configuration

Mode: You can select the connection mode, Auto negotiation or fixed rate.
MTU (1000 to 1500): You can adjust the maximum transmission unit based on your connection type, default value is 1492 bytes. The MTU range is from 68 to 1500.

IPv4 Configuration

Enable IPv4: IPv4 enabled (change not supported).
IP address resolution: You can set a static IP address for the unit (in case of static IP the user can set IP address, subnet mask and gateway address) or select DHCP mode to obtain IP address automatically. When you enable ZeroConf protocol, the device will set an IP address randomly to itself if it fails to find the DHCP server after few trials.
IP address: IP address of the device.
Netmask: Netmask address of the device.
Gateway: Gateway address for router definition.

Network Settings

Click “**Network**” under the Media Configuration menu. **Network Settings** page appears on the screen. Device’s network settings can be changed on this page.

Hostname Configuration

Hostname: User defined hostname for device (max 64 chars). If the DHCP server is configured to assign a hostname to the unit, it will be used, and will be shown here.

Note*! Underline is not allowed, use only marks A...Z, a...z, 0...9 and – (dash)*

Domain Name Server Configuration

If the unit needs to resolve an URL to an IP address by sending a name resolution query, (for instance NTP server given in URL form from DHCP) you need to enter at least one DNS server IP address.

DNS configuration mode: Static Mode or DHCP Mode. In **Static NTP mode** you can set up to 3 NTP servers, change the priority by moving the servers up and down and no needed servers can be deleted. The server on the top of the list has the highest priority and decreases down the list. In **DHCP mode** all controls are disabled and the priority is assigned by the DHCP server.

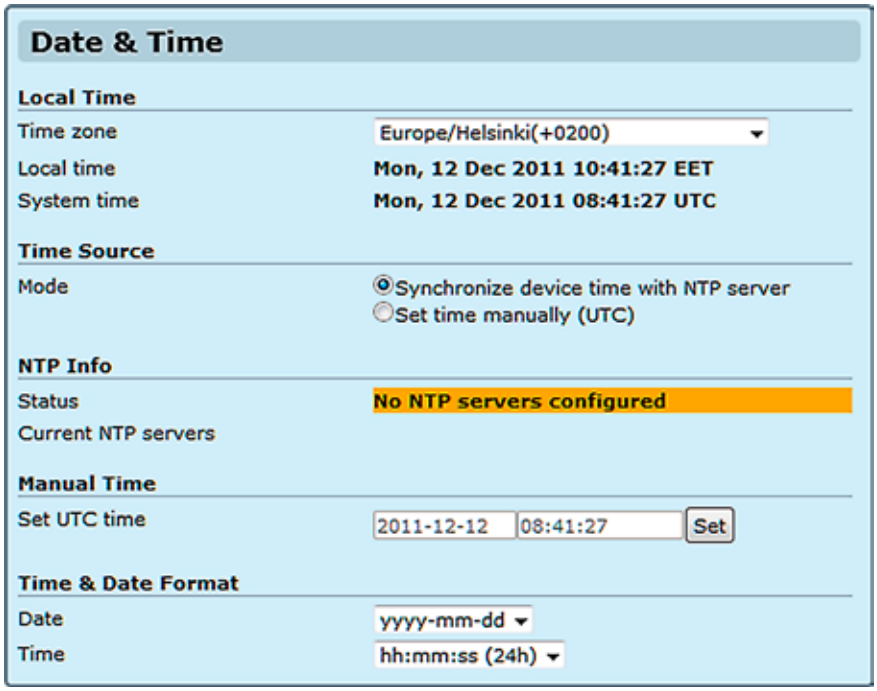
Search domains: Searches the given DNS domain (e.g. teleste.com) for lookup an IP address; you can add up to three domain names. You can change the DNS domains’ priority by moving them up and down. The top of the list has the highest priority.

DNS servers: Sends name resolution query to then given DNS servers, you can add up to three DNS sever. You can change the DNS servers’ priority by moving them up and down. The one on the top of the list has the highest priority.

Network Time Protocol (NTP) Configuration

NTP configuration mode: If you select DHCP server to control DNS and NTP settings, the manually entered DNS and NTP servers will be discarded.

NTP servers: You can add up to three NTP servers for time synchronisation. You can change the NTP servers’ priority by moving them up and down. The one on the top of the list has the highest priority.



Date & Time Settings

Click "**Date & Time**" under the Administration menu. **Date & Time Settings** page appears on the screen. Device's Date & Time settings can be changed on this page. This page also shows the system time and the local time calculated using the time zone set on the device.

Local Time

Time zone: Selected time zone. Defines how conversion from system time (UTC) to local time is done. For user the local time is shown, for example in video text overlay timestamps. Conversion also takes daylight saving time in to account.

Local time: Shows local time.

System time: Shows system time (allways in GMT).

Time Source

Mode: Source for the clock, either manual or NTP synchronized.

NTP info

Status: NTP status (synchronization OK, No NTP servers configured).

Current NTP servers: Shows configured NTP servers IP address.

Manual time

Set UTC time: Set UTC time manually.

Time & Date Format

Date: Select date format type.

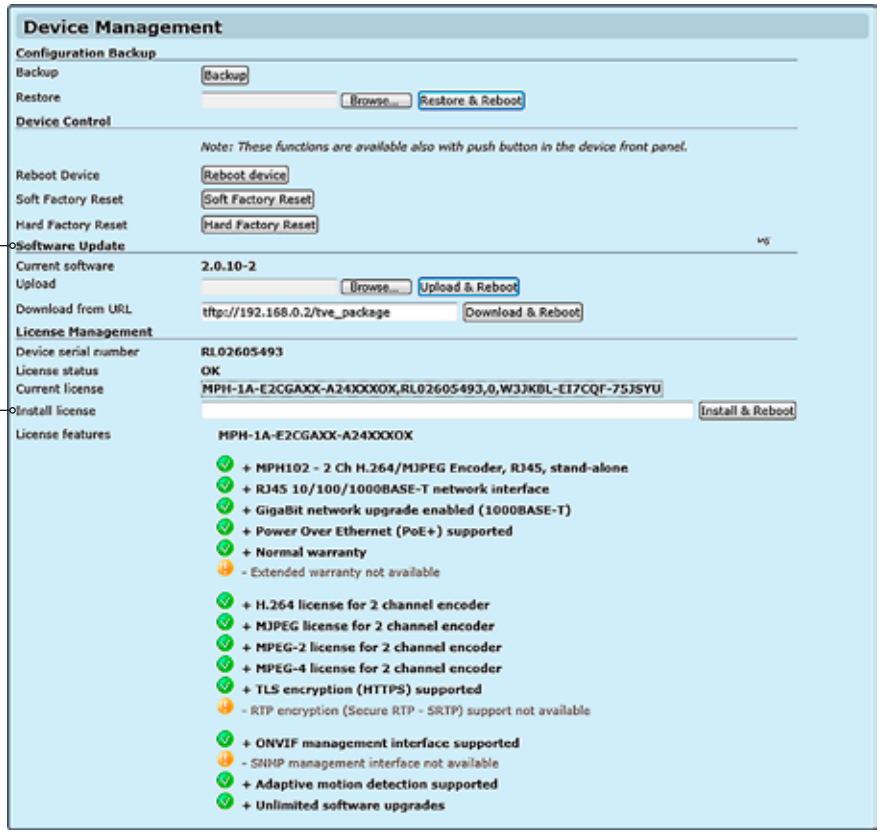
Time: Select time format type.

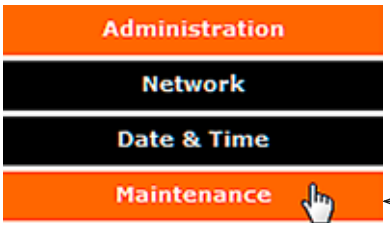
Notes! *If month is entered as 14, the date will change to February of the next year and if date is entered as 32, the date will change to the 1st of the next month if the number of days in the current month is 31.*

The date and time entered in the boxes has to match the format specified. If the required date is 1st Jan 2011 , it has to be entered as 01/01/2011 and not as 1/1/2011. The latter setting will throw up an error when saved.

***Note**! After the software has been updated, please clear your browser's cache to ensure the correct operation of WebUI.*

***Note**! A new license will replace the old one.*





Device Management

Click "**Maintenance**" under the Administration menu. **Device Management** page appears on the screen. This page allows you to make configuration backup and restore, reboot the device, apply soft and hard factory resets, update software and install new license key(s).

Configuration Backup

Backup: Click Backup to store the current configuration to a file.

Restore: Click Browse... to find/select the stored configuration file to the device and then click Restore & Reboot to save the configuration file to the device. Device restarts automatically after pressing this button.

Device control

Reboot Device: Click Reboot device to restart the device.

Soft Factory Reset: Click Soft Factory Reset to make a soft factory reset to the device -> restores all, except IP configuration to the default factory settings.

Hard Factory Reset: Click Hard Factory Reset to make a hard factory reset to the device -> restores all settings to default factory settings.

Software update

Current software: Shows device's current firmware version.

Upload: Click Browse... to find/select the new firmware file to the device and then click Upload & Reboot to upload the firmware file to the device. Device restarts automatically after pressing this button.

Download from URL: Click Download & Reboot to upload the new firmware file from user specified server (TFTP, FTP and HTTP) to the device. An example of FTP URL: "tftp://FTP_SERVER_IP/MPH-1-2.0.10-2.bin". Device restarts automatically after pressing this button.

License management

Device serial number: Shows device serial number.

License status: Shows current licence status.

Current license: Shows device's current licence(s).

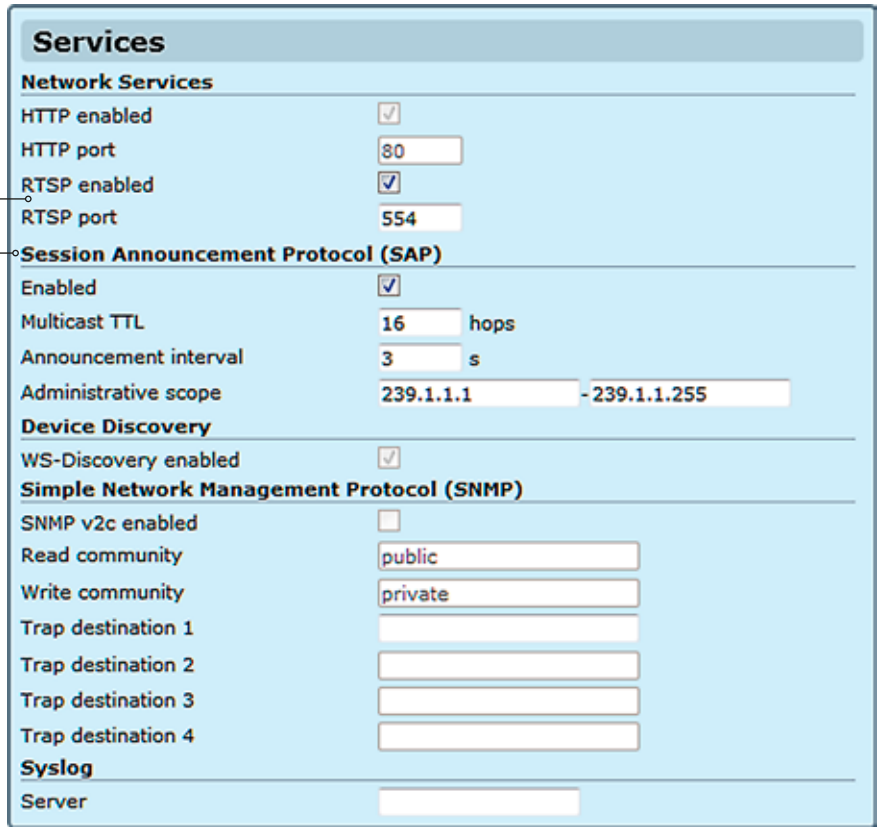
Install license: Copy a licence code here and then click Install & Reboot to take the license to use. Device restarts automatically after pressing this button.

License features: Shows installed and available licences for device.

The Real Time Streaming Protocol (**RTSP**) ia a network protocol used to establish and control media sessions between devices. For example, a video Decoder sends RTSP play command to the video Encoder.

***Note**! If port clash is detected while configuring RTSP server port, device gives an error message and disables RTSP server. After that you have to give an unused (valid) port and enable RTSP server again.*

Session Announcement Protocol (SAP) is a protocol for broadcasting multicast session information. A SAP listening application can listen to the SAP multicast IP address and construct a guide of all advertised multicast sessions (RFC 2974). SAP uses Session Description Protocol (SDP) as the format of the session descriptions. Announcement data is sent using IP multicast and UDP.



Services Settings

Click "**Services**" under the Administration menu. **Services Settings** page appears on the screen. This page allows you to enable/disable different network services available and configure following parameters of services:

Network Services

HTTP enabled: HTTP is always enabled.

HTTP port: Port 80 is used always.

RTSP enabled: Enable/disable RTSP (Real time streaming protocol) server.

RTSP port: Configure RTSP server port.

Session Announcement Protocol (SAP)

Enabled: Enable/Disable SAP service.

Multicast TTL: Multicast Time-To-Live for SAP packets (1...255).

Announcement interval: SAP timing in seconds (1...999). Retransmit time of SAP-packet. This time has to be same at both encoder and decoder pairs.

Administrative scope: Range of multicast IP addresses advertised with SAP. When the stream multicast address is within the SAP scope, end of the scope is used. Otherwise default SAP-address 224.2.127.254 is used. Default SAP-scope is 239.0.0.0 - 239.255.255.255.

Device Discovery

WS-Discovery enabled: This enables ONVIF device discovery feature.

Simple Network Management Protocol (SNMP) Currently this service is not upported.

SNMP v2c enabled: Enable/Disable SAP SNMP v2c protocol.

Read community: Specifies the read only community (public or private).

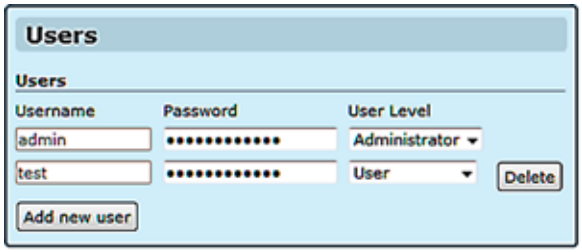
Write community: Specifies the write community (public or private).

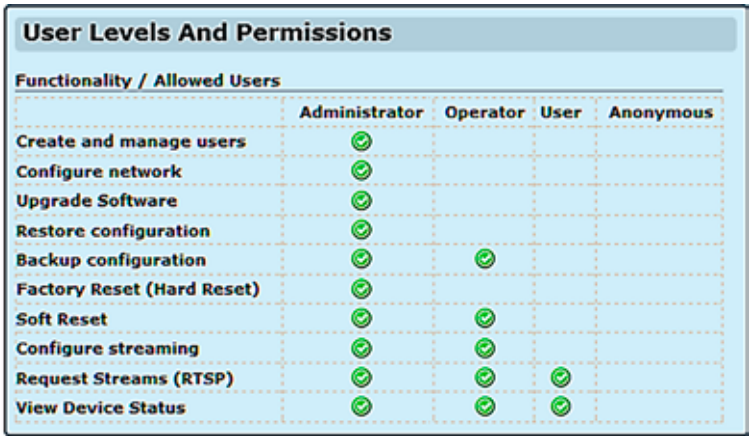
Trap destination 1...4: Trap Destination defines the IP address of an Agent receiving traps

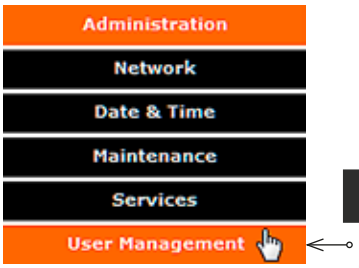
Syslog

Syslog is a standard for computer data logging. By using syslog you can collect messages sent from MPH on the syslog sever.

Server: Shows syslog server IP address. If this field is left blank then remote logging is disabled.







User management

Click "**User management**" under the Administration menu. **User management** page appears on the screen. This page allows you modify user settings.

Users

Shows device user accounts. All user accounts are protected by a user name and a password. Administrator user can create and remove user.

Username: Set username for user.

Password: Set password for user.

User Level: Select user level for user.

Functionality / Allowed users

Shows permissions for different users.

Command Line Interface - CLI

General

The **MPH** series video encoder unit includes a command line interface (**CLI**) for configuration purposes. The CLI is a screen interface that allows the user to interact with the operating system by entering commands and optional arguments.

The **MPH** supports CLI over UART (RS-232), Telnet and SSH.

CLI is accessed through any terminal emulator application. The command structure is the same for all session types.

> ***Note! PuTTY*** *is a free and open source terminal emulator application which can act as a client for the SSH, Telnet, rlogin, and raw TCP computing protocols and as a serial console client.* ***Tera Term*** *has comparable features to PuTTY.* ***Hyper Terminal*** *is not included in Windows Vista or later.*

The CLI can be accessed in the following ways:
- Serial data connection (RS232), via **Data 2** port, with a serial connection cable.
- TCP/IP connection, via active **Ethernet** port.

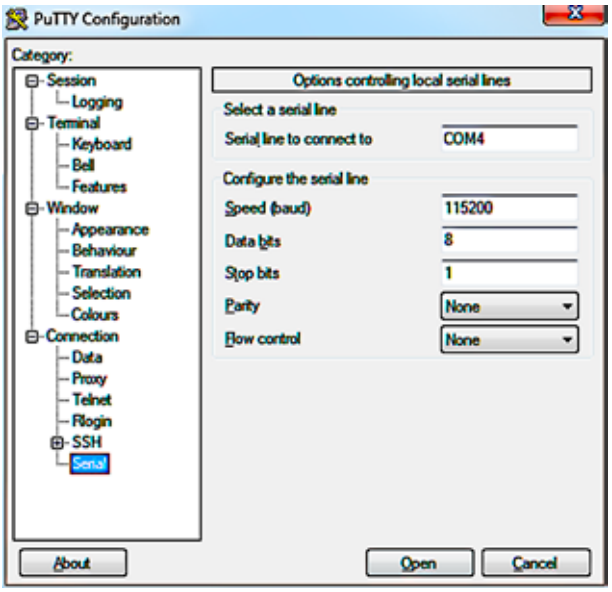
System requirements for CLI

Connection through Data 1 port locally (**UART**):
* PC equipped with terminal emulator application supporting **VT100** / **102** or **ANSI** protocols, e.g. Hyper Terminal, **PuTTY** or **Tera Term**.
* **RS232**-cable (type Teleste **CIC506**)

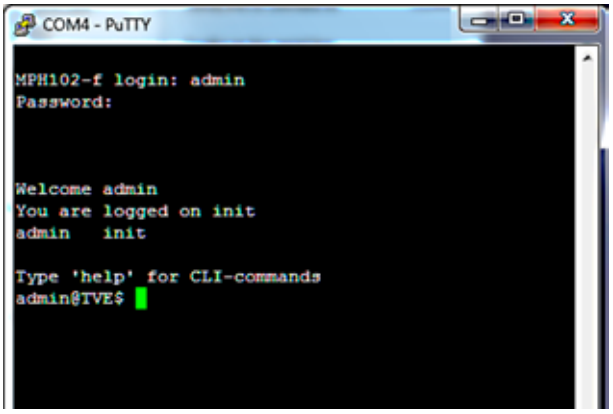
Connection through Ethernet port remotely (**Telnet/SSH**):
* PC equipped with terminal emulator application supporting Secure Shell (SSH) network protocol, e.g. **PuTTY** or **Tera Term**.
* **Ethernet**-connection

Setting	Value
Emulation	VT100, VT102 or ANSI
Protocol	RS232 (serial)
Baud rate	115 200 kbps
Data bits	8
Parity	None
Stop bits	1
Flow control	None

Port settings to local serial (RS-232) connection.



Serial (COM port) settings in Putty.



COM port settings in Putty.

Connection methods - Local serial connection

This chapter describes how to connect to CLI locally (via serial cable) using Putty terminal emulator application.

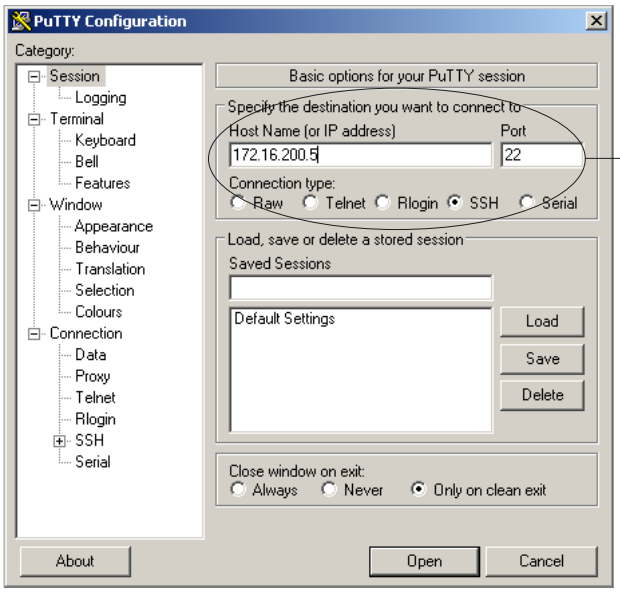
1. Start the Putty terminal emulator application. Wait until the following "**Putty Configuration**" window appears on the screen.
2. Select **Serial** category to continue. The following "**Options controlling local serial lines**" window appears on the screen.
3. Choose **COM** port where the **serial (RS232)** cable is connected, e.g. **COM4** port and then set here the values as described in table beside. Click Open to continue. The blank "**COM4 - PuTTY**" window appears on the screen.
4. To activate the terminal connection first press Enter --> "`MPH102-f login:`" appears on the screen (MPH name depends on device in question).
5. Enter the required user name and the password (admin/admin for administrator). The **MPH** Hyper Terminal window appears on the screen. The terminal connection to **MPH** series video encoder device is now completed and you can now use the CLI commands to management the device.

The terminal connection can be terminated by selecting File/Exit, Alt+F4 or clicking x on the right upper corner of Hyper Terminal window.

Connection methods - TCP/IP

This chapter describes how to connect to CLI via TCP/IP connection using Putty terminal emulator application. The same menus that are displayed on a local terminal are instantly available over an IP network.

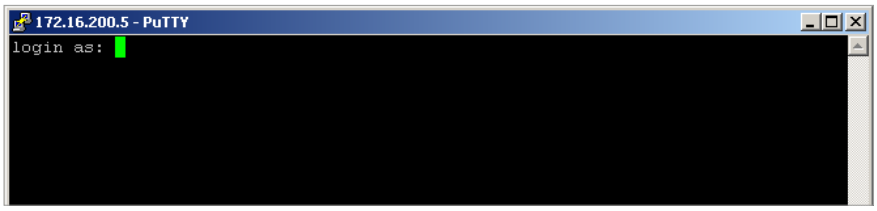
1. Start the **PuTTY** application. Wait until the following "**PuTTY Configuration**" window appears on the screen:



Required settings:
IP address:
Device IP address
Port: 22
Connection type: SSH

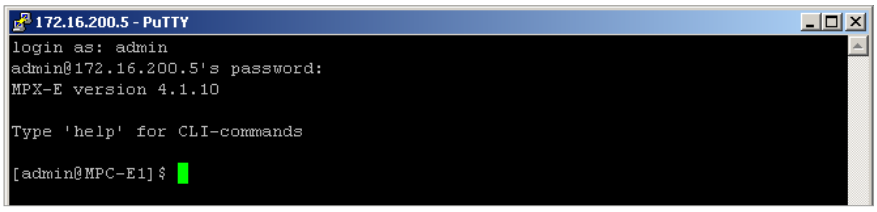
PuTTY application view (Windows XP).

2. Enter the device IP address into the "Host Name (or IP address)" address bar and click Open to continue.
   The following "**PuTTY**" window appears on the screen:



Telnet program view.

3. Enter the required user name and the password. The following "**172.16.200.5 - PuTTY**" window appears on the screen:



The **CLI** connection to **MPH** series video encoder is now completed and you can now use the **CLI** commands to management the device.
The **CLI** connection can be terminated by entering command **exit**.

Detailed descriptions of CLI commands

Command	Description
up	Jump to previous level
help	Displays a list of available commands in level
exit	Exits the session

CLI lets you enter several commands. To execute a command, press enter after typing command. By entering “Help” command you get a list of all available commands. To get more information about how to use a specific command you can enter “Help command”.
Ctrl+C is the interrupt key and returns user to the prompt.

Note! *letters can be typed either lowercase or uppercase.*

Main menu

Enter the **help** command to view a CLI main menu:

```
*************************************
                Main  menu
*************************************
 datetime                 sub menu
 devmgmt                  sub menu
 network                  sub menu

 up
 help
 exit
-------------------------
```

Datetime command

Enter the **datetime** command to view datetime menu:

```
*************************************
                datetime  menu
*************************************
 setutc

 up
 help
 exit
-------------------------
```

Entering **help setutc** displays a list of options for setutc command:

Use the **setutc** command to change device date and time settings.

```
setutc <-src=time_src> [<-date=date_str>] [<-time=time_str>]

Description:
Sets UTC date and time parameters. If no arguments are passed,
the command will display current date and time

<time_src>: manual/ntp
If manual mode is selected, then date and time should be
provided

[<date_str>]: Date in DD/MM/YYYY format

[<time_str>]: Time in HH:MM:SS 24 hour format
```

Devmgmt command

Enter the **devmgmt** command to view devmgmt menu:

```
************************************
                devmgmt  menu
************************************
 reboot
 softfactoryreset
 hardfactoryreset
 licenseupdate
 swversion
 swud
 getconf
 putconf

 up
 help
 exit
-------------------------
```

Available CLI commands in **devmgmt** menu. These commands allows you to manage device, as make factory resets, update firmware and save/restore device settings.

Entering **help reboot** displays information about the reboot command:

Use the **reboot** command to restart the device.

```
reboot

Description:
Reboot the device.
```

Entering **help softfactoryreset** displays information about the softfactoryreset command:

Use the **softfactoryreset** command to make soft factory reset to the device.

```
softfactoryreset

Description:
Soft factory resets the device. Specific configurations will
be reset to factory defaults. The device will reboot on this
command
```

Entering **help hartfactoryreset** displays information about the hartfactoryreset command:

Use the **hartfactoryreset** command to make hard factory reset to the device.

```
hardfactoryreset

Description:
Hard factory resets the device. All configurations will be
reset to factory defaults. The device will reboot on this
command
```

Entering **help licenseupdate** displays information about the licenseupdate command:

Use the **licenseupdate** command to activate a new licence to the device.

```
licenseupdate [<license_key>]

Description:
Update product license key. The license key will be validated
against device serial number before updating. The device
will reboot after successfully updating the license key. If
the licensekey is not provided, this command will print the
current license key

[<license_key>]: Product license key string. If this string is
not provided, current license key will be displayed

Example:
licenseupdate MPH-1A-E1CGAX-AXXAXXOX-
XXXXXXXX,HL00000000,0,EJPKOJ-XLJAYA-I72CA2
```

Entering **help swversion** displays information about the swversion command:

Use the **swversion** command to view the current firmware version of the device.

```
swversion

Description:
Prints the current software version
```

Entering **help swud** displays information about the swud command:

Use the **swud** command to change device's firmware.

```
swud <tftp link>

Description:
Downloads software image from tftp and update. Device will
reboot once the software image is downloaded successfully

<tftp link>: String of upto 128 characters with tftp://<ip_
address>/software_image format

Example:
swud tftp://192.168.36.148/tvelightimage.bin
```

Entering **help getconf** displays information about the getconf command:

Use the **getconf** command to download stored configuration from a TFTP - server.

```
getconf <-ip=server_ip> <-file=config_file_name>

Description:
Download configuration file from tftp server and restore
configurations. Device will reboot once the file is downloaded
successfully

Example:
getconf -ip=192.168.36.148 -file=tve.cfg
```

Entering **help putconf** displays information about the putconf command:

Use the **putconf** command to upload the current configuration to a TFTP - server.

```
putconf <-ip=server_ip> <-file=config_file_name>

Description:
Upload configuration file to tftp server for backup. The file
name can be chosen by the user

Example:
putconf -ip=192.168.36.148 -file=tve.cfg
```

Network command

Enter the **network** command to view network menu:

```
************************************
                network  menu
************************************
 linkstatus
 linklevel
 ip
 hostname
 dns
 ntp

 up
 help
 exit
 -------------------------
```

Use CLI commands in **network** menu to configure device IP settings.

Use the **linkstatus** command to see information from the network interface and link status.

Entering **help linkstatus** displays information about the linkstatus command:

```
linkstatus

Description:
Displays network interface and link status
```

Use the **linklevel** command to set link mode and mtu size.

Entering **help linklevel** displays information about the linklevel command:

```
linklevel [<-mode=mode_str>] [<-mtusize=mtu_size>]

Description:
Sets the link mode and/or mtu size.
mode_str: Can be one of the following:
       auto    : Auto negotiation
       100FD   : 100 mbps full duplex
       100HD   : 100 mbps half duplex

mtu_size: MTU size in bytes (Valid range: 64 to 1500)

If no arguments are passed, the command will display current
configuration
```

Use the **ip** command to change device IP settings.

Entering **help ip** displays information about the ip command:

```
ip <-mode=ip_mode> [<-addr=ip_addr>] [<-mask=subnet>]
[<-gate=gateway>]

Description:
Sets the IP mode. Also sets IP address, subnet and gateway in
case of static IP mode only
If no arguments are passed, the command will display the
current configuration.

<ip_mode>: static / dhcp
If manual mode is selected, then ip address, subnet mask and
gate way also should be provided

[<ip_addr>]: IP address

[<subnet>]: Subnet mask

[<gateway>]: Default gateway

Caution: If ip address is changed, you might have to login
using new IP address. Change in IP address might make the
device in-accessbile from your network if configured to a
different subnet
```

An example how to change device IP address, subnet and gateway:

network
ip -mode=static -addr=172.31.252.13 -mask=255.255.0.0 -gate=172.31.2.1

Entering **help hostname** displays information about the hostname command:

Use the **hostname** command to set a hostname to the device.

```
hostname [<hostname_string>]

Description:
Sets the hostname. If no arguments are passed, the command
will display current configuration

[<hostname_string>]: Hostname upto 32 characters (without
special characters or spaces)
```

Entering **help dns** displays information about the dns command:

Use the **dns** command to set DNS parameters to the device.

```
dns <-mode=dns_mode>[<-domain=search_domains>][<-servers=dns_
servers>]

Description:
Sets DNS parameters. If no arguments are passed, the command
will display current configuration

<dns_mode>: manual/dhcp
If manual mode is selected, search domains and dns servers
should be provided
dhcp mode is available only if 'ip mode' is set to DHCP.
Otherwise only manual mode is available.

[<search_domains>]: Comma seperated list of search domains
in decreasing order of priority (Upto 3 search domains are
supported)

[<dns_servers>]:       Comma seperated list of dns servers in
decreasing order of priority (Upto 3 search dns servers are
supported)
```

Entering **help ntp** displays information about the ntp command:

Use the **swud** command to change device's firmware.

```
ntp <-mode=ntp_mode> [<-servers=ntp_servers>]

Description:
Sets NTP parameters. If no arguments are passed, the command
will display current configuration

<ntp_mode>: manual/dhcp
If manual mode is selected, ntp server list should be provided
dhcp mode is available only if 'ip mode' is set to DHCP.
Otherwise only manual mode is available.

[<ntp_servers>]: Comma seperated list of ntp servers in
decreasing order of priority (Upto 3 search ntp servers are
supported)
```

MPH features

Video	MPH101/111	MPH102/112	MPH401/411	MPH402/412
CVBS Video input(s)	1 (with loop-through)	2	1 (with loop-through)	2
DVI Video input	-			
Encoding channels	up to 4			
Total streams	up to 8	up to 6	up to 8	up to 6
Coding	H.264/MJPEG/MPEG-4*/MPEG-2*			
Resolution	QCIF/CIF/2CIF/4CIF, ½D1/D1			
Frame rate (fps)	1...25 PAL, 1...30 NTSC			
Performance (max. 25/30 fps)				
H.264, MJPEG, MPEG-4*, MPEG-2*	1 x 4CIF/D1 4 x 25/30fps	2 x 4CIF/D1 2 x 25/30fps	1 x 4CIF/D1 4 x 25/30fps	2 x 4CIF/D1 2 x 25/30fps
ONVIF	Yes			
SNMP	Yes			
Motion detection	Yes			
Camera tampering	Yes			
Text overlay	Yes			
SAP	Yes (Session Announcement Protocol)			
NTP	Yes (Network Time Protocol)			
RTSP	Yes (Real Time Streaming Protocol)			
Data channels	2			
Standard	Data 1: RS422/485, Data 2: RS232			
Audio channels	-			
Coding	-			
Contact closures	2 in, 1 out			
Ethernet ports	1 x10/100/1000*Base-T or 1 x100/1000*Base-Fx (SFP)			
Protocols	RTP, UDP, TCP, IP, HTTP, DHCP, SSH, Telnet, DHCP, DNS, ZeroConf, ICMP, ARP, QoS			
SFP transceivers*	Fast/Gigabit Ethernet			
Fast Ethernet	MMF/SMF 1310nm			
Gigabit Ethernet	MMF/SMF 1310nm / SMF 1550nm / CWDM (ITU G.694.2) / SMF bidi 1310 / 1490/1550nm			
Management	WebUI / SNMP / CLI (password protected user groups with different user levels, CLI via serial or SSH connection)			
Size (H x W x D)	41 x 129 x 166.5 mm (1.6 x 5.1 x 6.6")		130 x 26 x 170 mm (5.12 x 1.02 x 6.69")	
Operating temperature	-34...+74 ºC (-29...+165 ºF)		-10...+60 ºC (-14...+140 ºF)	
Power consumption	5.5 W			
Power Over Ethernet	PoE+, 802.11at, 7.5W (class 3)		-	

Notes

Notes

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